JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON.

VOL. CII., No. 2351.——TUESDAY, JUNE 2, 1908.

EDITORIAL NOTES—GAS, &c.

Annual Report of the Institution.

THE annual report of the Council of the Institution of Gas Engineers has now been distributed among the members; and it shows that the Council have been engaged in many matters during the year, but that, as yet, there is nothing substantial in the way of fruit from their labours to present to the members. Concerning certain of the matters dealt with in the report—notably the investigation of the question of the insurance of gas-works employees under the Workmen's Compensation Act, 1906, and the measures taken to protest against the Coal Mines (Eight Hours) Bill—the Council have, through the Technical Press, given the members information as to their movements and the results. This practice is to be commended; and we hope it will be indulged in even more frequently in the future than in the past. Time was when, after an annual meeting, the Council (*quâ* Council) appeared to, metaphorically speaking, retire into their shells, and, to outside observers, both the Council and the interests of the Institution sank into a dormant state. Things have changed in this respect; and it is a change that may continue to develop with good effect. Secrecy and the deferring of information for months when ripe for dissemination among members of the Institution do not contribute to the maintenance of interest, and is certainly not helpful; while the alternative course has the opposite results, and affords an occasional indication of the diligence of the Council in the duties entrusted to them.

This enlightened change of procedure, however, relieves us on this occasion from specially noticing subjects included in the report which are already matters of history, but which may possibly evoke some little discussion and comment at the annual meeting. The two salient subjects of the report, and of the year's work, are indubitably those referring to the investigations into the various methods of carbonization, and the economical application of gas for general heating purposes. At the time the Sub-Committee on Carbonization entered upon their task, it was palpable, from a consideration of the ramifications of the question, and the largeness and variety of the problems which have developed themselves of late with an amazing vigour, that they were engaged on a work which, with the daily duties and responsibilities of the members, would absorb a considerable amount of time. There will be no disappointment that the Committee have not yet something definite in the way of a report with which to present the Institution. They have paid many visits to works, both in this country and on the Continent; they have amassed a large amount of information which has to be sifted and tested, and its valuable essence extracted. It is not a matter that lends itself to any impetuous treatment; and there are the more recent problems to be thoroughly penetrated before any report which can have a definite, complete, and up-to-date value can be presented. There is, for example, the present question of exceptionally high makes of gas per ton of coal, to which the suspicion attaches that, under ordinary carbonizing systems, the resultant gas contains more of those gases of negative property to the consumer than is the case under the latest methods of carbonizing. While every credit must be given to those who have succeeded in obtaining extraordinary productions of gas, it must be conceded that, if the Committee's inquiry directs positively to the best systems from which the extraordinary makes of gas of a kind that is most profitable to consumers can be realized, that alone will fully compensate for the time and money that are being expended from the special purposes fund. We are glad, looking at the matter from this point of view, to see from the report that the gas engineers on the Sub-Committee have enlisted the services of Dr. Harold G. Colman, and that he and one of the members of the Committee (Mr. A. E. Broadberry) have been engaged lately in testing the results of the Dessau system in Germany, and particularly in Berlin. Remembering the suggestive lecture delivered towards the end of last year by Dr. Colman on carbonization and the trend of investigation and result, as well as the masterly comparison he made in our columns not long since of the published results from the Dessau four and five metre vertical retorts, we shall expect much of instructive bearing on current transitional carbonizing work to eventuate from this visit to Berlin, where both Dr. Colman and Mr. Broadberry, the report duly acknowledges, received—as anyone would receive who went to Berlin on a similar errand—a most courteous reception from, and the helpful assistance of, Herr Körting.

The work of the Sub-Committee on the economical application of gas for heating purposes has not yet proceeded far beyond the fundamental stage; but the statement made in the Council's report on the initial stage of investigation is of considerable interest. The co-operation of the eminent physicists associated with the Leeds University gives an assurance of scrupulous accuracy in the work that will be carried out. The methods of conducting that work are fully described in the report, and are exposed to criticism, if any can be levelled against them. But after reading the statement, only one point really impresses upon which objection can be raised, and that is the smallness of the combustion room and its construction, which bear no analogy to ordinary rooms in which gas-fires are commonly employed. But there is a well-designed attempt to reproduce by artificial means the conditions in such rooms; and these means will also admit of a large range of regulation. We believe, too, that all that has been done will, in the result, mean precision in the ascertaining of the percentages of products and the actual temperatures under different modes of stove construction; and from this point of view there will be additional value. At the same time, the size of the room must impose limitations on investigation. In considering, too, its construction, the tests made by Dr. Samuel Rideal and Mr. Otto Hehner for the South Metropolitan Gas Company in an ordinarily constructed house near the Old Kent Road Gas-Works, and the results of those tests, very naturally cross the mind. Of this, however, there is no doubt, that the tests to which the stoves are to be subject at Leeds will be as exacting as science and opportunity can make them, and all the better will this be for ultimate improvement and efficiency. Associated with the Leeds University, is the question of the Institution Fellowship in Gaseous Fuel; and it is of interest to learn that Mr. Arthur Forshaw, M.Sc., to whom the honour of the first award of the fellowship fell, has "taken "up a very promising line of work on the relative 'mantle' "efficiency of carbonic oxide and hydrogen, which, it is "expected, will elucidate many obscure problems relative to "incandescent lighting, &c."

Several miscellaneous matters are dealt with in the report. Among them, it is noticed that a suggestion has been made to the Council that a Committee on Electrolysis should be appointed to deal with the "important" subject of damage to mains due to electrolytic action, and that the matter has been referred to the General Purposes Committee for report. It is to be hoped that the General Purposes Committee will be favourable to inquiry. We believe the suggestion emanated from Mr. A. G. Glasgow, in his capacity of Chairman of the Committee of the American Gas Institute who have been investigating the subject, and who presented to the members of that body a very valuable report thereon in 1906. The idea of Mr. Glasgow's Committee is that there should be in this matter co-operation between the British, American, German, and French central gas organizations; so that all the information available might be accumulated from all countries, and the organizations be kept mutually posted in all fresh incident and research. The excellent work that has already been done by both the German and American organizations, which work has focussed the conditions prevailing in this matter in those countries, is of inestimable value; and there is hope that the General

Purposes Committee of the Institution will not look unfavourably on the suggestion that has been made, in view of the fact that the Council admit the subject an "important" one. The antagonism of the parliamentary authorities to protection for subterranean gas and water pipes, and the stringent opposition of those who transmit electricity through the streets, to—despite their protestation as to the harmlessness of their systems—statutory protection to owners of such pipes, make it all the more necessary that there should be a central and systematic investigation of the subject on behalf of the home gas industry, and the accumulation of information as to actual injury. The Corporation Electricity and Gas Committees of Bolton are at the present time in conference on this subject of electrolysis; and they would not be doing this without cause.

Touching other subjects, it is satisfactory to find that there is to be a further reconsideration of the proposal for the framing of optional standard clauses for contract specifications; the reason formerly advanced for not proceeding with this matter being decidedly too feeble for acceptance. Equally satisfactory is it to learn that the Council of the Institution have offered Dr. John Wade all the assistance in their power in his investigation, at the instance of the Local Government Board, into the question of "injurious gases "evolved during artificial illumination."

Our French Visitors—Programme of Arrangements.

During the past week, the air has been full of the spirit of amity and goodwill between the great French and British nations. The manifestations of friendship in this country have been of the sincerest that one nation can possibly show to another. From His Majesty the King down to the lowliest of his subjects, to whom opportunity gave the power, the message of peace, goodwill, and co-operation was sent to our neighbours through the distinguished head of the Republic; and the *entente cordiale* has now reached a state that will make the relations of the two countries at this period famous at all time in the history of the world. Long may the close relationship continue. In small part, we of the gas industry in both countries have fostered that which has now matured —that which is not a mere sentiment, or a fleeting impulse, but something that is an actuality, and that can be felt and seen. Towards the end of next month, we are looking forward to again saying in London "*Bienvenue!*" to many representative men of the gas profession of France, all of whom will be members of the Société Technique du Gaz. Their welcome will be the most cordial. Very vivid are the recollections of the pleasure of the days in 1901, when a large body of the members of the Société were the guests of the gas profession of this country, and of the London, the Imperial Continental, the Continental Union, the European, and the Brighton Gas Companies. Those days will be lived over again, and, if anything, with more intensity through the developments of later years.

The members of the Société Technique will come to us under a condition of things bearing striking contrast to that which existed seven years ago. Peace and goodwill have since penetrated the domestic affairs of the British gas industry with excellent effect. The London Gas Companies now stand united in the van of work for the progress and stability of the gas industry; and, what they have, so united, achieved is written in our history. Schism is dead in the British gas profession. Seven years ago we had a Gas Institute and also an Institution of Gas Engineers; and our friends from abroad wondered. Unity has come. To-day we have but one central organization, with all the District Associations federated to it. Unity and co-operation make for progress and defence in an industry and profession just as they do among nations. Our visitors next month will have much upon which to congratulate their hosts. The *entente cordiale* between France and Great Britain was, seven years ago, still in embryo, and almost meaningless to many; and the prospects of amalgamation between the two central British gas organizations were not of the most favourable. All has come to pass; all has ended well. At this time, when the two nations have been cementing their unity and friendship, and when the representatives of the gas professions of the two countries will be doing their part in the same direction in London, at the Franco-British Exhibition and elsewhere, the words employed by Mr. Corbet Woodall, when presiding at a luncheon given by the Institute and Institution at the Hotel Cecil to their French visitors in 1901, comes to mind. He then said: "I very much wish that these meetings of "Frenchmen and Englishmen were more frequent. I fully "believe the kindly feeling which always characterizes our "personal meetings might probably be extended so as to "make the greater the cordiality between England and "France. That may God bring speedily." And the concluding words of his speech on that occasion were: "We "have been rivals in many fields, with varying issues; but "I trust, and we all trust, our rivalry in the future will only "be in the direction of advancing those efforts of Science "and Commerce which tend to the union, the advancement, "and the comfort of the nations of whom we form part." The hope was well founded; the eloquence of the words have been improved by the years and the events.

We feel certain that a goodly number of the members of the Société Technique will make every effort to be in London four weeks hence. They will arrive on June 28; and private arrangements have been made to welcome them that day. On the Monday, on the private invitation of Mr. Corbet Woodall and Mr. H. E. Jones, both of whom are honorary members of the Société Technique, the visitors will be entertained to luncheon at the Franco-British Exhibition, and will there meet the Committee of the Gas Engineering Section of the Exhibition. Concerning the hosts on this occasion, the view may be confidently expressed that there is no British gas engineer who has had such an intimate personal relationship with Continental gas engineers as Mr. Woodall, mainly, but not entirely, through his connection with—first as Consulting Engineer, then as a Director—the Imperial Continental Gas Association; and Mr. Jones has also been brought into close relationship with his French professional brethren through his position as Deputy-Chairman of the European Gas Company, who were the hosts of the Société Technique when they visited Havre in 1905. On that occasion, Mr. Jones greatly extended his circle of friends in France. But to proceed with the programme of arrangements. The Gaslight and Coke Company, as the premier Gas Company, not only of Great Britain but of the world, have invited the visitors to dinner on an evening to be chosen by the Société—most probably on the Tuesday. If suitable arrangements can be made, this will also be at the exhibition; if not, elsewhere. Then it is understood that on Wednesday some of the party will visit gas-works in London; and a considerable contingent propose to go to Bournemouth, to inspect the system of continuous carbonizing in vertical retorts, which has been fully described from time to time in the "Journal," and the latest word upon which will be uttered at the Institution meeting prior to the visit of the members of the Société Technique.

It is a pleasure to find such a programme of hospitality for the visitors has been so easily arranged. With these provisions, and the Franco-British Exhibition, its gas section, and the high-power gas lighting to occupy the hours of leisure between the fixed engagements, we predict a time of much happiness and interest for our visitors from France.

About Thrift.

The French nation has long been held up as a striking example to all the world of the benefits accruing from the practice of that most admirable, and frequently neglected, virtue—thrift. Even those whose acquaintance with France and French history is limited, are aware of the general truth of the statement that the thriftiness of the French peasant is exemplary, and has become proverbial. It is this national characteristic that, in times of storm and stress, has stood France in such good stead, and has proved the secret of her great recuperative power. The French gas-worker, we have no doubt, is no whit less admirable in his thrift than the peasant; and now, thanks to the energetic initiative of the Société Technique de l'Industrie du Gaz en France, further opportunities, facilities, and encouragements are being provided for him to increase his economies and to invest his savings.

We refer in some detail, in another column, to the Insurance and Benefit Society—Société de Secours Mutuels—which has just been launched, under the auspices of the Société Technique du Gaz, for the better provision for the declining years, or for the dependants, of the French gas-worker. In that term are included all servants and employees, from the gas-works' manager or engineer to the stoker or labourer. It is a truly democratic organization; and we venture to think that it should prove, if at all amply supported, of the greatest utility in still further welding the gas industry of France into one homogeneous whole. Gas

companies and others in France can support the scheme as contributing but non-benefiting members. All workers can become participating members, and benefit by one or other of the insurance policies of the Society—preferably by the payment of annual premiums to secure a capital sum within a certain number of years; or an annuity for life can be purchased. But whatever selection be made, the assured has the advantage of putting by his savings for a definite object in a mutual society which understands his position, sympathizes with his aims, and carries out his objects more efficiently and economically than could be done by him as an isolated unit in an ordinary insurance company.

In our own country, an attenuated form of old-age pension is being discussed. In a few gas-works an excellent system of co-partnership has been adopted, which is calculated to give both increased interest in present work and fuller security in future ease. But without any desire of vilifying the British working man, who has so many sterling virtues, we are reluctantly compelled to admit that thrift is not among them. Is not that, therefore, all the more reason why every opportunity should be afforded him for the easy cultivation of those habits of thriftiness which are the characteristic of his co-worker across the Channel? We are afraid, however, that the genius of our people does not lie along the same lines as does that of our French friends and neighbours, and that what may be suitable and successful for the one is not necessarily so for the other. Much as we should like to see in England a strong, unified, self-supporting gas-workers' benefit and insurance society, embracive of the whole gas industry, still we are fain to recognize that it is hardly within the sphere of practical suggestion, and is certainly beyond the reach, and indeed outside the scope, of the Institution of Gas Engineers.

Parliamentary Topics.

Touching parliamentary affairs, it is difficult this session to retain anything but a disjointed interest in them by making observation only from the standpoint of the gas industry. There are, however, two or three matters this week upon which a few remarks should be made. The most satisfactory announcement that it has been our lot to make recently in connection with the happenings at Westminster was that briefly introduced into the "Notes from Westminster" as we were going to press last week, that full justice has been done by Parliament to the Draycott Gas Company for the outrage perpetrated upon them by the Long Eaton Gas Company, who neglected for years their concurrent powers of supply in a certain area, and then, when the district had been developed by Draycott, went to their consumers and offered a gas supply at a price lower than they can afford to sell at in Long Eaton itself. This was not fair play; it was not ordinary commercial competition; but it was an altogether indefensible assault on a small company by a larger and stronger one. Parliament has by the decisions of the two Houses virtually proclaimed it so; and there is not the slightest doubt that the tactics of the Company did more than anything else to prejudice their case and position. Any man of affairs who reviews the whole of this case will, with the real motives and actions of the Long Eaton Company dangling so obtrusively before him, see a ludicrous side in the professions of saintly concern, on the part of that Company's representatives, for the people in the contested area enjoying the price at which the Company were supplying gas to them. It was made clear that the Long Eaton Company coveted that which the Draycott Company had, with labour and zeal, obtained while the other Company neglected, and that they intended by hook or by crook to wrest it from them. They have not succeeded; and both Houses of Parliament have awarded them just the rebuke they deserved.

Under the present order of things, the House of Commons seem content to follow a devious line of conduct, and to decline to have the principles of to-day regarded decisively as applicable principles for the morrow. Sufficient for the day, it seems, are the principles thereof. Last year, in connection with both the Worthing and the East Hull Gas Bills, the House resolutely declined to interfere with the decisions of Committees; but this session, on the invitation of Mr. John O'Connor, the House instructed Mr. Luke White's Committee to reconsider their decision on the Dublin and Central Ireland Electric Power Bill, which incorporates the scheme for generating electricity by engines driven by gas produced from peat. True, the Bill has since been very considerably modified by omitting Dublin, Rathmines, Rathgar, Pembroke, and certain parts of King's County; by reducing the capital from £450,000 to £150,000, with borrowing powers; and by curtailing the title to the Central Ireland Electric Power Bill. Singly or collectively, these alterations offer no sufficient reason for upsetting the decision arrived at, after three days' hearing a couple of months since, by Mr. White's Committee. While they then declared the preamble of the Bill not proved, they were distinctly of opinion that the whole scheme was speculative, and that its financial aspects were not of a kind to merit their esteem. However, they have followed the instruction of the House to reconsider the dismembered measure; but it was a perfunctory sort of reconsideration, which ended by the Committee interpreting the instruction as one embracing the passing of the preamble. Looking to the former inquiry and to the one last week, and comparing the causes of decision—the one because the scheme was speculative and financially unsound, and the other because the House had ordered reconsideration, and not because the removal of the best districts from the scheme had strengthened prospects—one is induced to agree with Sir Ralph Littler, K.C., who appeared (with Mr. A. M. Paddon) for the Alliance and Dublin Consumers' Gas Company, that the unprecedented action of the House in this case constitutes a very dangerous innovation.

The only other matter to which it is desired to make brief allusion is the Port of London Bill. Last Tuesday was the final day for lodging petitions against this Government measure, and for objectors obtaining right to a hearing before the Joint Committee of the two Houses who will be considering the measure. The names of the petitioners massed together as they are in the parliamentary papers look formidable; but when their evidence comes to be analyzed, it is believed that it will be found that they are not against the salient principles of the Bill, but are appearing on details or for protective purposes. This, we fully anticipate, will be the case in connection with the petitions lodged by the Gaslight and Coke Company, the South Metropolitan Gas Company, the Commercial Gas Company, the South Suburban Gas Company, and the Wandsworth and Putney Gas Company. As was the case when the recent Bill of the Metropolitan Water Board was in Parliament, there will be great difficulty—in fact, it will, as then, be a matter of impossibility to compose all grievances; but whatever is done, it cannot be contended that it is to the interests of London and the port that such rates should be levied on the raw material (say) of gas manufacture that the people of London would be compelled to pay a higher price for so necessary and highly popular a commodity. The scheme of the measure was so recently commented upon in these columns, that we refrain from further remark on this occasion, except to say that the Joint Committee who will be considering the Bill commence their sittings to-day.

Investment of the Special Purposes Fund.

In the criticism in these columns a fortnight since of the special purposes fund which the parliamentary authorities have created to supersede the insurance and renewals funds, objection was taken to the option given to the investment of the accumulated money in trustee stocks or its application to the general capital purposes of a company. The clause is being inserted this session in certain Bills in which powers to form a renewals fund were asked for; but we do hope before Parliament go too far in granting such latitude in the utilization of the new fund, they will see the unwisdom of the option, withdraw it, and compel the investment of the money in readily realizable trustee securities outside the undertaking. There are several reasons for this. No financier with any reputation for sound finance would regard as prudent this permission to invest in the undertaking itself; and all shareholders who are not moved by specious argument will feel more security in a fund, whatever the purpose for which it is reserved, that is invested in outside, and readily negotiable, stocks. The security provided by a reserve fund of any kind essentially lies in the availability of the money; and such reserves are really the main principals in financial stability.

But there is another, and to our mind important, reason why the special purposes fund should not be invested in a company's own capital. It is a fund that Parliament propose shall be accumulated from revenue by 1 per cent. appropriations, with a maximum equal to 10 per cent. of the paid-up capital. Parliament, by the option they are giving, are supplying the

means, to, it may be, the injury of consumers (there are badly managed gas companies as well as excellently managed ones), whereby companies who are not anxious to have their proceedings analyzed before a Parliamentary Committee can defer their appearance in Parliament for a longer period than their ordinary capital powers would otherwise allow them to do. Much of the time of Parliamentary Committees is absorbed by the arguments of Counsel and the evidence of witnesses as to the probable requirements of capital over a normal term of years, before a company again submits their statutory powers to the revision of Parliament. The special purposes fund clause does not exact any pledge from the promoters of Bills as to whether or not the fund will be invested outside or applied to the general capital purposes of the undertaking; it merely gives the Directors of the Company the right of exercising their discretion in the matter. Therefore, in effect, Parliament will (unless the option be removed) simply say: "Here is sufficient capital to last so many years; but you may also "accumulate up to 10 per cent. of your paid-up capital, "and supplement with that the capital we give you. This "will enable you to keep free from parliamentary revision "for a longer period." It is a curious condition of affairs. We have no objection to Companies keeping away from Parliament as long as they possibly can, if their interests and those of their consumers do not suffer in consequence. Our purpose in raising the point here is because it is a cardinal belief with us that a sound financial condition is at the very base of the best interests of all concerned.

The question of depreciation also comes in. As soon as this money "reserved" to meet non-preventible circumstances and to pay for replacements and removals, but not renewals (whatever this may all mean), is utilized for the general capital purposes of the Company, and the plant or other appliances represented by it is put to work, so soon does it begin to depreciate, and provision ought to at once commence for its ultimate replacement. But if the fund has reached its maximum of 10 per cent. of the paid-up capital, no such provision can be made. We should not have referred to this matter again, but there is a very strong feeling that Parliament has made a mistake in this matter; and that every course should be pursued to get the option removed, so that funds reserved for special purposes should be kept absolutely intact, and in outside and readily marketable securities.

Saving Daylight and Economizing Artificial Light.

Further inquiry and the evidence of Sir George Livesey before the Daylight Saving Bill Committee seem to indicate that the economy that would be effected in the use of the agents for producing artificial light, by the change contemplated by the Bill before Parliament, has been somewhat over-estimated by the authors—in fact, Sir George thinks the loss to the gas industry would, in the aggregate, be so small as not to be worth consideration. His figures are set out in the report of his evidence in our "Parliamentary Intelligence." The opinion there expressed is supported by the experience of the Imperial Continental Gas Association and of the South African gas undertakings. In both these cases, changes in time caused a reduction in the consumption of gas; but it was of such a character that the circumstance has almost faded from the memory of those officially concerned. When Mid-European time was introduced in April, 1892, it really only made a slight reduction in the consumption of gas in the towns of Germany that the Imperial Continental Association supply. The difference between the new and the old time, however, only amounted to about half an hour. This is how Sir Julian Goldsmid, the then Chairman, referred to the matter at the meeting of the shareholders in November, 1893: "Another matter which has caused some diminution in the consumption of gas in Germany is the adoption of Mid-European time. This practically makes the day half an hour earlier in the towns in which it has been adopted. People see that the clock points to eleven or ten; and, being accustomed to going to bed at that time, they naturally go. They also shut up their shops correspondingly earlier; and this has led to a diminution in the consumption of gas." Sir Julian also pointed out that neither his colleagues nor himself could control such matters, and that they were obliged to accept them as they found them. This is practically the same experience that more recently the South African Companies have had.

The Other Side of the Question.

Even were the effects on the industries supplying the agents for artificial lighting greater than experience suggests they will be (of course, the proposed difference in time is longer in the present instance), it would be an inadequate ground upon which to offer real antagonism to a scheme in support of which there is such a strong promise of resulting moral and physical benefit. That Sir George Livesey thinks this side of the case is somewhat overdrawn (though he approves of early rising) is shown by the fact that he declares that, even if the Bill passes, he shall leave it to the vote of the South Metropolitan Company's employees whether or not they shall shape their day accordingly. But if there is to be an alteration at all, it must be, if we are to avoid confusion, by an alteration of the clock; and if the rest of the people in the country move and live in accordance with the statutory regulation of hours, those who were unsubmissive at the start would, we fancy, very soon be compelled to fall into line through force of surrounding circumstances. There is one effect that Sir George fears, and that is if men have more leisure time in the evening, they will spend more money. We submit another view. Is it not possible that the more hours of daylight men have, and the fewer hours of darkness in the evening, there will grow upon them a greater liking for outdoor recreation, with a lessening of the desire that the hours of darkness produce for the gaiety and glamour of the public-house? However, regarding the principal competitor of gas in the supply of light, our friends of the "Electrician" say: "With such legislation in view, it behoves the station engineer to look still more actively for other means of disposing of electrical energy, and *to look upon electric lighting as a poor part of the business.*" Very well!

Plundering the Gas Consumer.

The agitation against an increase of the rates in Manchester has had one effect to which we, at all events, as the Gas Committee have done, cannot "bow with all humility." The result of the protest of substantial ratepayers against the proposed increased rate has been the cutting down of the estimates of three of the spending Committees by only £7000; but this was insufficient, without other aid, to maintain the rates at the old figure. The Finance Committee, with the unrighteousness that characterizes many municipal finance committees, recommended that the Gas Committee should increase their contribution from the funds of the department by £10,000, making it £60,000; the Electricity Committee by £2000, making their contribution £12,000; and the Tramways Committee by £10,000, making their contribution £70,000. The Council have agreed. Finance committees ought not to counsel unequal taxation. This increase in the drafts from the profit-earning Committees at Manchester points the inequality better than anything else could possibly do. Why should the gas consumers pay, in addition to their own rates, the rates of the gas undertaking and £60,000 besides towards the relief of the rates chiefly of those who are in a better pecuniary position than they are themselves? Gas is consumed very considerably by the poor and by the middle classes in the city; the tramways are also used more by the same classes than by those in more affluent circumstances. Between them, these two departments are this year paying no less than £130,000 in relief of the rates. Electricity, favoured for the lighting of hotels, and the larger shops, only contributes £12,000! Do the labour representatives on the Council realize what this means? Enough has surely been said to show how in Manchester the poorer and middle class people are plundered to ease the rate payments of people in better circumstances. Alderman Gibson emphatically protested against this piratical method of meeting the financial obligations of the city; but we do regret that his Committee authorized him to say that, if the Council insisted on having the additional £10,000, they would "bow with all humility, as they always had done." So long as the Committee bow with humility, so long will the major part of the Council vote for these depredations of the gas consumer. The time for treating these things with "humility" has passed; the time for active resistance has arrived. Let the labour members of the Council consider what this plundering means to the slot-meter consumers; they may then vote in favour of an amendment against proposed appropriations in the future. Readily enough would Alderman Gibson promise a reduction in price, if he could only succeed in ridding his department of this annual incubus.

Gas Matters in Birmingham.

When the highly satisfactory report for the past year of the Birmingham Gas Department, which has already been referred to in our pages, came before the City Council last week, the members had the advantage of hearing a lengthy statement by the Chairman of the Committee, Alderman Sir Hallewell Rogers, with regard to the position of affairs; and thereafter there was some discussion upon the price charged for gas. Naturally, the principal point touched upon by Sir Hallewell Rogers was the position arising out of the retirement of Mr. Henry Hack from the post of Engineer-in-Chief. He pointed out that Mr. Hack had been connected with the undertaking for the past thirty-six years, and had been Engineer-in-Chief since 1902, when Mr. Charles Hunt retired; and he paid a warm tribute to Mr. Hack's great energy and indomitable perseverance, which did not allow him to spare himself for a moment in doing what he regarded as being in the best interests of the undertaking. Not the members of the Council alone, but also Mr. Hack's many friends in the gas industry, will join the Committee in wishing him long life, and will regret that he was not in the enjoyment of better health when he took leave of the Committee. As to the work of the department itself, it is to be noted that a scheme for looking after incandescent burners on consumers' premises has been inaugurated; and that within a few days applications have been received for the cleaning of somewhere approaching 3000 burners. There seems here to be proof that the citizens are fully alive to the advantage of having their burners in perfect working order; and this will lead to contentment in the matter of light. Judging, however, from remarks made at the Council meeting, there is another point—that of price, chiefly of gas for industrial uses—regarding which some dissatisfaction prevails; but the Chairman of the Committee said he could hold out no hope at present of reducing the price of gas consumed for heating, soldering, and various other purposes. In this connection, Mr. Arter quoted figures which showed that, by the existing system of handing over big profits in aid of the rates, the large and small consumers are affected in varying degrees, though neither class gets back in reduction of its rates anything like the amount it contributes by way of gas profits—for, of course, the non-consumers also have to receive the same proportion of relief, while contributing nothing towards the profits.

Some More Results.

Another instance in which a large amount is to be handed over in relief of the rates is Nottingham, whose Gas Committee decided to recommend that a sum of £30,000 should be placed at the disposal of the Finance Committee in aid of the general district rate. This is out of a net profit of £50,317 which has resulted from the past year's working, so that the Committee still have a balance of some £20,000 to distribute over the various funds of the undertaking. The consumption of gas continues to increase; while the carbonizing costs per 1000 cubic feet of gas sold were less last year at 2·7d. than they were the year before, when the figure was 3·01d. The amount contributed to the rates at Bolton is £20,000. At West Bromwich (whose results for 1907-8, curiously enough, fall to be recorded in the issue of the "JOURNAL" which contains a report of the visit of the Midland Association of Gas Managers—the President of which is the Gas Engineer, Mr. H. E. Copp—to the works) there is also a satisfactory tale to unfold. There was an increase of over 4 per cent. in the quantity of gas sold; while, as was the case at Nottingham, more money has also been obtained from the residuals. In his own report, Mr. Copp remarks that oil gas used as an enriching agent imparts to the mixture of coal and water gas greater heating power than the benzol formerly used; and though a plant erected for the gasification of oil which has been recently erected has only been at work at intervals since last November, the average calorific power of the town gas during the year has been 621 B.Th.U., as against 615 B.Th.U. during the preceding year, notwithstanding the use of an increased proportion of water gas. Carbonizing and coke wages, it will be seen, amounted to 1·65d. per 1000 cubic feet of gas made, as against 2·13d. in the previous year.

The Acetylene Industry in Congress.

It may certainly be said with truth that these are the days of "internationalities;" and few, if any, there will be who will feel inclined to complain of the fact. The advantages—great as they undoubtedly are from this particular point of view—are not to be found solely upon the political side. Science and industry in all places gain largely by the interchange of experience and opinions which takes place at the various congresses which are now so often arranged of people belonging to different countries who are engaged in the same line of research or business. The most recent of these gatherings was held last week, when those connected with acetylene in this country and on the Continent met together to discuss the matters in which they are mutually concerned. A good deal of business was transacted; and the large number of delegates who were present—especially from France—was proof that much interest was taken in the proceedings. But these international functions are necessarily carried through under certain disadvantages. Of course, it goes without saying that nowadays everyone ought to speak several languages; and, as a matter of fact, a thorough knowledge of three was the minimum that would have enabled one to understand all that transpired at this Acetylene Congress. Some of those present could not, unfortunately, claim acquaintance with the necessary three languages, and so were unable to follow all the proceedings; but there were others who were possessed of this advantage, and among them was Sir William Ramsay, who welcomed the delegates first in English, next in French, and finally in German. Not by any means the least interesting part of the congress, by the way, was Sir William's opening speech (delivered, however, in English only), in which he recounted some of his recollections of the earlier experiments with acetylene. Later in the meeting came a long list of papers, most of which were both read and discussed in French, which was the language of their authors. The general proceedings, as well as the figures regarding the importation of carbide into this country during recent years quoted by the President (Mr. F. S. Thorn), go to show that acetylene is making good progress in its particular line—which is, of course, the illumination of places where a public supply of town gas or electricity is not available. From one of the English communications read at the congress, it would seem that acetylene is experiencing a good deal of rivalry from air gas. This is only to be expected, as they cover precisely the same field of operations. But the respective advantages and disadvantages of the two systems is a matter that they can well be left to settle between themselves—with perhaps just an endorsement of a remark made by Mr. Leon Gaster that scientific facts are nowadays required in support of claims of specific advantages on behalf of any particular method of illumination. An abstract report of the proceedings at the congress is in type, but has unfortunately been crowded out of this issue. It will, however, appear next week.

PERSONAL.

Mr. A. WATT, who has been for four years Manager of the Oldmeldrum Corporation Gas-Works, has been appointed Manager of the Banchory Gas Company, in succession to Mr. R. Forrest, who has resigned.

Out of the numerous applicants to fill the position rendered vacant by the removal of Mr. James Taylor from the Hollinwood Gas-Works of the Oldham Corporation to take the management of those at Mossley, Mr. N. G. LEMMON, of Croydon, has been selected, and he will commence his duties on the 1st prox. He has been for twelve years with Mr. James W. Helps, first as pupil and subsequently as assistant.

There was a crowded gathering at the Barry Hotel, Barry, on the evening of the 22nd ult., on the occasion of the presentation, by the staff of the Gas and Water Departments of the Urban District Council, of a large photographic group of the whole of the officials and workmen, handsomely framed and suitably inscribed, to Mr. F. M. HARRIS, the former Gas Engineer, and another to Mr. E. W. WAITE, who till recently filled the position of Water Engineer, in token of the regard and esteem in which they were held by the donors. Mr. R. Lewis, of the clerical staff, presided; and he was supported by Mr. T. E. Franklin, the Gas and Water Engineer. The presentation to Mr. Harris was made by Mr. Rich, who expressed the sincere regret of every employee that his connection with the works had been severed, and, on their behalf, wished him and Mrs. Harris many years of happiness. Mr. Harris having acknowledged the gift, Mr. F. J. Clarke made the presentation to Mr. Waite, who, in expressing his thanks, said he was delighted to see Mr. Franklin with them, for he knew that in him the staff had a gentleman to whom they could all look with respect and admiration. As they had been true to Mr. Harris and himself in the past, he hoped they would also be loyal to the present Engineer. Mr. Franklin, who was called upon, said he hoped to merit, in the course of time, the excellent feeling existing between the staff and his two predecessors.

NOTES FROM WESTMINSTER.

A FEW matters of interest both for our gas and water readers occurred last week in connection with the progress of Bills through Committee; but the references to them below need no preliminary remark here.

Defeat of the Long Eaton Company. The delivery of the decision on the Draycott Company's Bill on Monday last week enabled us to announce that the House of Lords, as the House of Commons had done, had confirmed the Draycott Gas Company in their tenure of a certain district, and had definitely decided upon the eviction of the Long Eaton Company from it. The story has been told so frequently that to relate it again would only bore our readers. The best part of the whole business is that both Companies have got what they deserved; and when that happens, justice has been done. The proceedings before the House of Lords Committee (partly reported in the "Parliamentary Intelligence" last week, and concluded in this issue) raised nothing fresh, save that it was very noticeable that the experience in the House of Commons and the time that had elapsed had not done anything in the way of putting backbone into the case of the Long Eaton Company. Less was heard, too, of the fatuous talk there was before the Committee of the Lower House about the lessons of general trade competition being applicable to the gas business, which, being under statutory restriction and control, and necessitating a special distribution system, is something altogether different from general free trading. The witnesses for the Long Eaton Company got into a disagreeable quagmire over this competition question when before the Commons Committee; and they touched upon it very guardedly this time. Of course, in competition as in other things, it must be held that what is sauce for the goose is sauce for the gander; what is good in the way of competition for a district outside Long Eaton must be good for Long Eaton itself. When the Company's witnesses before the Commons Committee spoke of the beneficent effects of competition in the district in question, all who heard knew that, if Parliament allowed the competition to go on, those effects would last just as long as it suited the purposes of the Long Eaton Company to allow them, and that time would have been when they had pushed the Draycott Company out of the area. Had the price throughout the Long Eaton district been the low one that ruled in the disputed area, the effects of such a price would have made shareholders consider before this the wisdom of looking about for a fresh Board of Directors. A policy such as that of competition in gas supply cannot be applied in any patchwork kind of fashion; it must be universal. The Long Eaton Company have had an expensive experience, but the fault was entirely their own.

Renewals Fund Clause. The old renewals fund clause in the Draycott Company's Bill went through the Lords Committee without any challenge. Whether there is a stage at which the authorities of the House can substitute the special purposes fund clause will not be seen now until the Act is before us.

Peat Gas Scheme Again. A curious state of things has arisen in connection with the Dublin and Central Ireland Electric Power Supply Bill. The preamble of the Bill was declared not proved by Mr. Luke White's Committee; and we thought the last had been heard of the measure. But the promoters, nothing daunted, went away, and cut down territory and capital required, and then asked one of the intrepid representatives of Ireland—John O'Connor to wit—to request the House to instruct the Committee who had rejected the Bill to reconsider it in its shortened form. For such a course there is no precedent; and if all promoters of defeated Bills were allowed this privilege, it would be a question when and where the Private Bill work of a session would end. But the measure is not out of the wood yet. It has to go before the Upper House. It may be their Lordships will consider, as did Mr. Luke White's Committee originally, that there is too much speculation and financial uncertainty about the scheme to allow it to go to the public for capital with the endorsement upon it of parliamentary sanction. The matter is referred to in our editorial columns.

Electricity Supply in Outside Areas. A Committee of the Lords have reversed the decision of the Police and Sanitary Committee in connection with the proposal of the Finchley Council to extend their cables for the supply of electricity beyond their administrative territory. The extension was a small one, so small as to be negligible were it not that a question of principle was involved, which, if not challenged, would have formed an awkward precedent for the future. That was the very proper view of the Southgate and District Gas Company, for whom Sir Ralph Littler, K.C., appeared. There are serious objections to allowing an extension of trading by a local authority over their borders. The District Council have incurred loss by their electricity trading without roving outside their own territory; and therefore, not only through the competition, but as ratepayers, the Gas Company have been injured. Consequently, they suggested the application of the Northumberland clause. This was the rock on which the proposals of the Council split; and what happened shows, despite their protestations to the contrary, that these municipal traders in electricity look with pertect abhorrence upon being directed to conduct the financial affairs of their undertakings in an ordinary commercial way. Before they would submit to the Northumberland clause, they gave up all the clauses referring to extension. They had the option from the Committee, and made their own choice. Again action speaks louder than words.

Unprofitable Prepayment Consumers. The efforts of a couple of promoters of Gas Bills this year to obtain power to make unprofitable prepayment consumers contribute sufficient to meet the charges involved in fitting up their houses, have not so far met with success. The Padiham District Council (*ante*, p. 348) sought to gain new power in this direction. It was refused by the Police and Sanitary Committee. The Swinton and Mexborough Gas Bill came before the Lord Chairman last week. In it there was this variation of the model prepayment clause: "The maximum charge for the hire of a prepayment meter without fittings shall be at the rate of 8d. per 1000 cubic feet of gas supplied through such meter, provided that in any case where the maximum charge aforesaid shall not exceed an amount equal to a rate of 10 per cent. on the cost of the meter, the Company shall be entitled, if they think fit, to make a minimum charge not exceeding that amount." The Home Office it transpired had raised objections to this variation; and the Lord Chairman would not allow it. He did not, however, press for its immediate excision, but asked the Parliamentary Agent to confer with him on the subject.

Swansea Valley. The promoters of the Swansea Valley Gas Company have very wisely come to an agreement with the Swansea Gas Company, who strongly objected to the similarity with their own of the name of the new concern, and also to the proposed limits of supply. The Swansea Gas Company were not successful in the Lords with their opposition; but they had put themselves in a position to repeat their request in the Lower House. The promoters were well advised in coming to an agreement, by changing their title to the "Tawe Valley Gas Company," and confining their operations within defined limits. The change of name can make no real difference to them; and to concede the point, was better than fighting.

Water Schemes. There has been a perfect deluge of water schemes before Committees in the Lords and Commons. The Liverpool Corporation have striven hard before the Police and Sanitary Committee to obtain relief, within three years, from the obligation imposed on them in 1880 to supply water, if required, to Warrington, St. Helens, and Widnes; but they have been just as strenuously opposed by the three authorities concerned. The Committee, however, regarded the compact made in 1880 as perpetually binding, and considered that no strong case on public grounds was made out by the Liverpool Corporation to justify the relief sought. The sanctity of the parliamentary bargain should not, in the opinion of the Committee, be violated; but that is not always the view of Parliamentary Committees, as for example when the East Hull Gas-Works Purchase Bill was before the Police and Sanitary Committee. It would be, as the *status quo* has been maintained, waste of time to discuss here a condition of things that remains unaltered. Before a Committee under the chairmanship of Lord Newton, the Monmouthshire County Council have been urging their claim, in the interests of the county, to establish a Water Board; and to make better provision for water supply; and several sittings have been absorbed by the consideration of the scheme. The opposition was large, strenuous, and effective; and many were the efforts made to conciliate the opponents. The financial proposals were a sore point; various local authorities and interests making a firm stand against any general rate—though it was only ½d. in the pound—being imposed upon any districts other than those who actually took the water. It was submitted, too, that a very dangerous precedent would be created in giving a County Council such powers as those contemplated. The Bill did not succeed; and the scheme over which there had been much local excitement, departed this life with an abruptness that was very disconcerting to the promoters. Among other interesting Welsh schemes that has been before a Commons Committee is that of the Pontypridd Water Company. It is what Mr. Balfour Browne describes as a heroic scheme; but there is—at least, so experts and Mr. William Jones, the Company's Manager, declare, no possible alternative. Of what the scheme consists was the subject of statement in the "Notes" when the Bill was before the House of Lords. Briefly, it is contemplated to construct a reservoir to impound the water of the Llia River, an additional capital of £285,000 is asked for, and power to levy additional rates, with protection to the consumers by periodical revision. The Engineer for the scheme is Mr. Prestcott Hill. The Bill was further considered yesterday. The South-West Suburban Water Bill has been discussed before a Commons Committee; and on the representation of the Local Government Board, there has been amendment affecting the Company's rates and charges, as well as provision made for the better filtration and pressure of the water. An exceptionally peculiar state of things was disclosed in connection with the Ammanford District Council Bill, which might have been averted if earlier gaugings of a stream had been taken. The District Council were contemplating new works, taking for the purpose water from the Loughor, with a stipulation for a considerable quantity of compensation water to the Loughor and Cennen. Belated gaugings, however, showed that the flow of the Loughor was a precarious

one; and that it would be dangerous to undertake the provision of the compensation water agreed upon. Negotiations were entered into by the Council for providing a reduced quantity of compensation water; but, these proving unsuccessful, the Council asked the Committee to define a lower flow. Naturally there was vigorous opposition from those having rights on the river. Another point discussed was that the Council's present works were constructed merely under the powers of the Public Health Act; and so, in a sense, the Council had done something illegal, or at any rate they stood in a perilous position in regard to any injury they might occasion by taking water. The upshot of the discussion before the Committee was that the proposed new scheme was rejected; but the established works were legalized. The Water Bill of the Criccieth District Council has also been considered by the Police and Sanitary Committee. The object of the measure is to acquire existing water-works, and obtain an additional supply. The Committee gave the powers sought, but with the greatest reluctance, believing that a heavy burden is thereby going to be imposed on the ratepayers.

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 586.)

It is an agreeable task to have to chronicle a real improvement in the state of things on the Stock Exchange. A particularly gratifying feature is that last week the markets emancipated themselves from the thrall of the American, and went hand in hand with the cheap money movement. A favouring breeze came from the North-East, with the settlement of the labour dispute. Business, too, was on a more active scale, although it was account week; and the settlement went on placidly without a threat of any difficulties. The opening on Monday was not promising; for the old disquieting factors were at work, and prices for the most part were easier. On Tuesday, however, a good start with the recovery was made; all the chief markets except the American scoring a rise. Wednesday was bright and buoyant, and the fine weather was conducive to good traffics. Investment buying proceeded briskly. Consols rose $\frac{5}{8}$, and all the rest (with the previous exception) were up. The same characteristics held good on Thursday; but before the close and after the Bank rate had been reduced, there was some amount of realization to secure profits. On Friday, there was good business, despite the attention demanded by the settlement. Choice securities were strong; and Consols advanced $\frac{7}{16}$. Saturday brought a bright close to a bright week, and prices were very good. Consols rose another $\frac{1}{4}$, and changed hands once at 88. In the Money Market, the supply was at first very abundant and easy; but the Stock Exchange demand later on made it more employable. Discount rates took an easy line persistently. The Bank rate was lowered on Thursday from 3 per cent. (fixed on March 19) to $2\frac{1}{2}$ per cent.—the lowest rate for more than three years. Business in the Gas Market maintained its activity, and the tendency was inclined to improve. In Gaslight and Coke, the ordinary was not quite so firm at first. It touched 93 once, but became firmer afterwards, and was done at $94\frac{1}{2}$ on Saturday. The secured issues were very quiet; the maximum marking 89, and the preference $107\frac{3}{4}$ and $108\frac{1}{2}$. South Metropolitan was irregular; opening at 119, dropping in mid-week to 117 special, and recovering to 119 before the close. The debenture changed hands at from 84 to 85. Commercial 4 per cent. was done at 106, and ditto $3\frac{1}{2}$ per cent. at 103. In the Suburban and Provincial group, Brighton "A" marked 156 and $156\frac{3}{4}$, British from $41\frac{3}{4}$ to $42\frac{1}{4}$, Bromley "A" 118, Tottenham "B" $105\frac{1}{4}$, and West Ham $101\frac{1}{8}$ and $101\frac{1}{2}$. In the Continental Companies, Imperial was strong, with prices rising from $176\frac{1}{2}$ to $179\frac{1}{2}$. The debenture was done at $94\frac{1}{4}$. European fully-paid changed hands at $23\frac{3}{4}$, and Cagliari at $24\frac{1}{2}$. Among the undertakings of the remoter world, Bombay was done at $6\frac{5}{8}$, and ditto new at $4\frac{5}{8}$ *cum div.*, Buenos Ayres at 11 and $11\frac{11}{16}$, Hongkong at $18\frac{3}{8}$ and $18\frac{1}{2}$, Melbourne 5 per cent. at $100\frac{3}{4}$, Monte Video at 12, Primitiva at $5\frac{13}{16}$, ditto preference at $4\frac{15}{16}$ and $4\frac{31}{32}$, ditto debenture at $94\frac{1}{2}$, and River Plate at from $12\frac{5}{8}$ to 13.

Diseases of Workmen.—We have received from Messrs. Butterworth and Co., of Bell Yard, a work on the above subject by Dr. T. Luxon and Mr. R. Hyde, M.R.C.S., with an introduction by his Honour Judge Ruegg, K.C. Dr. Luxon is a Medical Referee under the Workmen's Compensation Act, 1906; and in his preface to the book he explains that the need for a handy work of reference has been felt by persons interested in the action and application of the Act. His production does not, he says, assume to be anything beyond an enumeration and concise description of the various diseases contracted by workmen in the course of their employment, couched in language not too technical, so that it may be more readily comprehended by the non-technical reader; and it does not touch upon aspects of the diseases mentioned apart from their relation to the Act. The sections of special interest to our readers are those dealing with poisoning by bisulphide of carbon and the affections of the skin or the corneal surface of the eye due to "pitch tar" or tarry compounds. The text occupies 111 pages ($8\frac{1}{2}$ in. by 5 in.), with a list of references and also an index. The price of the book is 4s. net.

ELECTRICITY SUPPLY MEMORANDA.

Backdoor Competition—Success of Gas in Calcutta—Troubles of Electricity: Explosions and Electricity Robberies—Financial Straits of an Electricity and Tramways Board.

The electricity industry as by law at present established is being attacked on all sides, and in all its branches of business. Undertakings exist in the glorious uncertainty of never knowing where and when the next assailant will be springing up. The "Financial Times" calls attention to the business in electricity supply that can be carried on, without any parliamentary sanction or restriction, by a person or persons generating electricity, by merely securing wayleaves on private property for the necessary distributing cables; and at the present time, it seems, there is no one with power to stop marauding of this kind. It is stated that a Syndicate has actually been formed to exploit the neighbourhood of Glasgow in this manner, though the district is well served by the local authorities, in addition to whom the Clyde Valley Electric Power Company have supply rights in the area. Power users have already been canvassed with offers of electrical energy at a price somewhat lower than the tariff of authorized suppliers; while the railway companies have been approached with attractive proposals for wayleaves. The Syndicate would, if they are given the facilities for carrying out their plans, pick and choose the best customers, and neglect those who would not be paying ones; and they will be free of the obligations and many of the expenses imposed upon authorized distributors. But we rather think they will soon be roped-in by the new regulations applying to the generation and use of electricity in factories; and when a Government department gets further control in this respect, there will quickly be succeeding steps to put an end to raiding upon statutory preserves. Authorized suppliers, too, will not let the matter rest until the technical flaw is remedied that enables this form of untrammelled business to be indulged in. No one can prevent a man, a firm, or a company generating electricity for his own use; any more than a gas company or gas-supplying municipality can prevent anyone using a suction gas or producer gas plant. But when it comes to distribution through private grounds and back-door competing business, the position is altered. We agree with our financial contemporary that the chances of such business being permanent, or worth purchasing or supporting, is very remote. People will be wise to keep their money in their pockets, and only invest it in substantial undertakings with statutory rights.

There is always something wrong when gas succeeds on its merits in beating electricity, as it so frequently does, for any purpose. Over a year ago, tenders were sought for the public lighting of Calcutta; and the Oriental Gas Company have succeeded against the local Electric Light Company. "Over a year" is a fairly good time for the consideration of a matter of this kind; but after all that has been done, and after all the time devoted to the question, the electricity people and their supporters do not think justice has been done them. Their chagrin can be well understood. But the competition, be it remembered, has not only been by tender, and bare word arguments. There has been something more substantial. Large exhibitions have of late been held in Calcutta, at which gas and electricity have shown of their very best; and so the municipal councillors have not been so ignorant of relative merits in coming to a decision over the public lighting as the home critics of the Special Committee may suppose. These demonstrations were no doubt really more forcible arguments than those our electrical friends describe as the "strongest" against electricity. These "strong" arguments were: Probable failure of supply at any time, thus leaving the city in total darkness; the necessity of having the streets "up" for laying mains for the new system; and enhanced original expenditure and upkeep, as compared with gas. These may have had effect; but unquestionably efficiency and cost were also important factors in judgment. However, this is the free-and-easy manner in which the "Electrical Review" disposes of this defeat of electricity: "The non-technical councillor out East is generally too busy a man to worry over details, which after all do not interest him greatly; and as gas has done fairly well [many thanks!] in Calcutta as a street lighting agent, he was content to accept it rather than risk, as he thought, something about which there was a doubt, or at least a controversy." The municipal councillors of Calcutta who rather pride themselves on their thoroughness in dealing with the affairs of their great city will not thank the electrical critic for this slight on their sense of the responsibility that rests upon them in the discharge of their public duties.

The troubles incidental to the supply of electricity appear to be as great as, if not greater than, those connected with gas supply. A few weeks ago there was a picture in one of our electrical contemporaries depicting the damage done to a small tailor's shop by an explosion of gas that had accumulated through a neglected escape. Under the picture were the words "Gas caught Red-Handed." But we do not suppose that the picture, published in the "Daily Mirror" on May 25, of the effects of the explosion that occurred opposite Marlborough House last Saturday week, owing to a short-circuit and the generation of gas (the newspapers report) from the bitumen with which the wires were covered, will be reproduced in the same quarter. Fairness demands that it should be. However, short-circuits and explosions are only two of the troubles of electricity. A third has similarity to the experiences of gas suppliers in the robbery of the distributed

commodity by unscrupulous consumers. To rob the gas supplier of some of his commodity, connections have to be uncoupled, and a piece of indiarubber tubing introduced; but the surreptitious appropriation of electric current appears to be a matter of comparative ease, and the detection one of some difficulty. This is a side of electricity supply that is heard of with increasing frequency; but only occasionally is a clear case obtained that can safely be taken into Court. There has been one at Salisbury just lately; but, in this instance, it was a slot meter consumer, who, clever as he was, did not go the right way to work to evade detection. There seems, however, to have been no end of difficulty before the Electric Light Company felt on sufficiently safe ground to prosecute. Apparently they had not too much faith in the accuracy of the meters with which defendant was supplied. During the past two years in this man's house, the slot meter has been changed six times on account of suspected inaccuracies. Since last November, the money in the meter and the electricity registered has never tallied. Then an employee of the Company hit upon the device of putting seals at the back of the screws of another meter; and this led to the undoing of the fraudulent consumer. One seal was afterwards found dislodged, which indicated that the screw had been taken out. It is quite possible, by the insertion of a wire through one of the screw holes, to obtain electricity by way of a slot meter without prepayment. Since July, 1906, the various meters this consumer has had, if correct, had registered 144s. worth of electric current, and only 36s. had been collected from the money-box. Defendant denied doing anything to the meter beyond "jogging" it "because he thought the money had not gone quite down." The Bench, with the wisdom of Benches, considered the denial was not so reliable as the testimony of the meters; and the defendant left the Court branded as a convicted purloiner of electricity.

A letter in the "North Cheshire Herald," over the *nom de plume* of "Searchlight," justly calls for a searching investigation and thorough overhauling of the affairs of the Stalybridge, Dukinfield and Hyde Joint Tramways and Electricity Board. That body are pursuing just now a disastrous policy—a policy that has already brought a heavy tax upon the ratepayers in the areas of the constituent authorities. Unprofitable are the undertakings managed by the Board, and they seek to damage the profitableness of the Corporation Gas Departments by (this is a matter upon which comment was made recently) exhibiting a notice in the tramcars giving a misleading statement as to the relative cost of gas lighting and electric lighting. It is an anomalous proceeding; and the authorities concerned should insist on these notices being removed, or else have contradictions posted alongside them. But that is only one of the faults of the administration. Another is the mismanagement that has produced the financial failure of the two concerns entrusted to the Board. In the Electricity Department alone (that is to say, outside the tramways), the Board have an expended capital of £200,000; and this is about to be enlarged. The accumulation of deficit amounts to £20,723. To this must be added the contributions from the Corporations amounting to £12,673—the two items making £33,396. Deducting from this the appropriations for sinking fund (£9531), there is a total loss of £23,864. The Tramways Department is in worse case—in fact, the condition of its affairs looks hopeless. The total loss on the tramways is above £41,000! "Searchlight" very rightly says that, so long as the scheme can be subsidized and the loss be made up out of the rates (which is grossly unjust to the non-users of electricity), so long will an indifferent financial policy be allowed to prevail. Prices should be charged of an amount sufficient to make the undertakings self-supporting. The ratepayers should see that the hole in the bucket is stopped, and should decline to be made the source of supplies for undertakings that are not run on ordinary commercial principles. If the elected representatives of the ratepayers will not deal with their trading undertakings in a business kind of way, then they should be told that their public services can be dispensed with to the advantage of the entire community.

Natural Gas in Kansas.—Natural gas has been discovered in ten counties out of the 105 in the State of Kansas. According to the "Journal of the Franklin Institute," its history and distribution in the Kansas-Indian Territory field are so closely connected with those of oil as to be almost inseparable. About the year 1860, the numerous shallow oil wells drilled to depths of a few hundred feet in South-Eastern Kansas yielded traces of natural gas as well as of oil. Twenty years later, gas in small quantities was found in a number of places near Independence. The first good gas well in the vicinity of Neodesha, which is now a centre of production of gas as well as of oil, was drilled in 1893. The present production of gas in the Independence quadrangle is enormous; the value of the quantity now annually consumed being estimated at about $800,000. More gas sands than oil sands are encountered in the drilling of individual wells. This oil may be found above the gas or below it. The gas is believed to come mainly from depths of 1800 to 2300 feet. Thus far most of the gas has been put to local use. It furnishes the light, fuel, and power of practically all the cities and most of the farm communities, and is extensively employed for fuel in drilling and pumping. It also supplies the city of Parsons and its numerous industrial plants. All this forms but a small percentage of the quantity consumed and to be consumed by the manufacturing industries which have grown out of this natural commodity.

INSTITUTION OF GAS ENGINEERS.

Programme for the Annual Meeting.

In previous issues of the "Journal," we have given a general indication of the arrangements for the forthcoming annual meeting of the Institution of Gas Engineers, which will be opened on the 16th inst., at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, under the presidency of Mr. W. Doig Gibb, M.Inst.C.E., Engineer to the Newcastle-upon-Tyne and Gateshead Gas Company, and closed on the 18th inst. in the Congress Hall of the Franco-British Exhibition, Shepherd's Bush. We are now in a position to furnish, from the programme issued, a few additional particulars as to the arrangements for the meeting.

On the opening day, the proceedings will commence at half-past ten with the usual preliminary business, including the presentation of the annual report of the Council (noticed below), the accounts, and the medals awarded for papers read last year. These matters having been disposed of, the President will deliver his Inaugural Address, and a commencement will be made with the technical business.

The following is the list of papers, the order of reading which will, as usual, be arranged at the meeting of the Council preceding the opening of the meeting:—

"Co-partnership." By Sir George Livesey, of London.

"The Extraction of Cyanides and Manufacture of Yellow Prussiate, by the Davis-Neill Process, at the Linacre Gas-Works, Liverpool." By Mr. Edward Allen, of Liverpool.

"Refractory Material." By Mr. F. J. Bywater, of Birmingham.

"Recent Experience with the Dessau Vertical Retorts." By Mr. A. F. P. Hayman, of Berlin.

"Description of the New Gas-Works at Valby, Copenhagen." By Mr. J. O. V. Irminger, of Copenhagen.

"Continuous Carbonization in Vertical Retorts." By Mr. H. W. Woodall, of Bournemouth.

Some of the above matters will engage the attention of the members till two o'clock, at which hour the proceedings will be adjourned till the following morning.

On the second day, at ten o'clock, the annual general meeting and a special meeting of the donors and subscribers to the Benevolent Fund of the Institution will be held, at which the report of the Committee of Management for 1907-8, with the accounts for the year ending Dec. 31, 1907, will be presented; two members of the Committee will be elected to succeed those retiring by rotation; and a Trustee will be appointed to fill the vacancy caused by the death of Mr. W. J. Warner. At the conclusion of this business, a lecture will be delivered by Professor W. A. Bone, D.Sc., F.R.S., of Leeds, entitled "The Combustion and Thermal Decomposition of Hydrocarbons;" and then the reading and discussion of papers will be resumed.

In the evening the President and Mrs. Gibb will hold a reception and give a dance at the galleries of the Royal Institute of Painters in Water Colours, Piccadilly, where the pictures of the Pastel Society are on view.

The members will assemble at half-past ten on the morning of the 18th in the Congress Hall at the Franco-British Exhibition, and deal with the remainder of the papers. Subsequently the concluding business—comprising the announcement of the election of President, Vice-President, Honorary Secretary, Ordinary Members of Council, and Auditors for the ensuing year, and the nomination of the President of the Société Technique and of Mr. Dugald Clerk, F.R.S., as honorary members—will be disposed of. In the afternoon, the Gas Section of the Exhibition will be visited, under the guidance of the Chairman of the Committee (Mr. H. E. Jones), Hon. Secretary (Mr. J. W. Helps), and other members of the Advisory Committee.

As already announced, an invitation was received some weeks ago, from the German Association of Gas and Water Engineers, for the members of the Institution to visit Berlin after the meeting, and spend a few days there in accordance with the programme of which we gave an outline in the "Journal" for the 12th ult. It is stated that the list of those who have accepted the invitation has been completed from the replies received in response to the circular issued on the subject. For those who were unable to avail themselves of the hospitality of the German Association, there will, as our readers are aware, be an excursion to Brighton on the 19th inst. The Brighton and Hove Gas Company's works at Portslade will be open for visiting on production of the card of membership.

Annual Report of the Council.

The Council present the following report on the present position and work of the Institution during the past year.

Membership.—At the end of the year 1907, the total number of names on the register was 804, as compared with 799 for the previous year. The figures are made up as shown in the usual tabular statement below. Nineteen members and eight associate members were elected, eight associate members transferred to the

class of member, and three students admitted; while the losses due to deceases, &c., numbered 35.

Class of Member.	At Dec. 31, 1906.	Elected and Transferred during 1907.	Deceased, Transferred, and Elected during 1907.	At Dec. 31, 1907.	Increase.
Honorary members .	23	2	2	23	..
Members	669	27	20	676	7
Associate members .	95	8	11	92	−3
Students	12	3	2	13	1
Totals	799	40	35	804	5

The Council regret to record the decease of the following members:—

John W. Carr	Johannesburg
William Hammond	Bognor
Evan Jones.	Aberdare
William M'Crae	Falkirk
Henry R. Robinson	Mossley
Frederick Russell	Torquay
Oswald Charles Shadbolt	Grays
Harrison Veevers	Dukinfield
William J. Warner	Tadcaster
William B. Wright	Epping

Annual General Meeting.—The annual general meeting of 1907 was held from the 18th to the 20th of June, in the Lecture Theatre of the Royal Dublin Society, Leinster House, Kildare Street, under the presidency of Mr. Charles Hunt, and was exceptionally well attended.

Dublin was selected as the place of meeting on account of the Irish International Exhibition being held in that city. The Committee responsible for the arrangements were greatly assisted by Messrs. George Airth (Dundalk), R. Bruce Anderson (London), Francis T. Cotton (Dublin), T. J. Reid (Ballina), and James Whimster (Armagh).

The Council welcome this opportunity of acknowledging the cordiality of the reception which was extended to the Institution by the Right Hon. the Lord Mayor of Dublin (Councillor Nannetti, M.P., J.P.), the Alliance and Dublin Consumers' Gas Company, and the Executive of the Exhibition. The thanks of the Institution are also due to the Dublin United Tramways for travelling facilities, and to the Directors of Messrs. Guinness and Sons and of the Great Southern and Western Railway Company respectively for permission to view their establishments.

The programme of papers read and discussed was as follows:—

"The Testing and Hygienic Efficiency of Gas-Fires." By Mr. J. H. Brearley, of Longwood.

"The Carbonization of Coal, with Special Reference to the Bye-Product Coking Process." By Mr. Ernest Bury, of Little Hulton.

"Incandescent Gas Lighting, with Special Reference to Inverted Burners." By Mr. Harold E. Copp, of West Bromwich.

"The Sale of Gas." By Mr. F. W. Goodenough, of London.

"The Use of Tar for Roadways." By Mr. H. P. Maybury, of Maidstone.

"Notes on the Use of Excess Gas from Bye-Product Coke-Ovens for Lighting and Power Purposes." By Mr. C. E. Rhodes, of Rotherham.

"High-Pressure Distribution Development in the United States." By Mr. Robert M. Searle, of Rochester, N.Y.

"The Financial Significance to the Gas Industry of the Modern Bye-Product Oven." By Mr. Paul Schlicht, of New York.

"Gas Consumption Development of Small Undertakings." By Mr. J. G. Tooms, of Waterford.

In addition to the above, a lecture on "The Use of Gas from a Hygienic Standpoint" was delivered by Professor Vivian B. Lewes, F.I.C., F.C.S., Honorary Member of the Institution.

The three medals offered in connection with the papers read at the meeting have been awarded by the Council as follows: The London Gold Medal to Mr. J. H. Brearley, of Longwood, for his paper on "The Testing and Hygienic Efficiency of Gas Fires;" the Institution Silver Medal to Mr. F. W. Goodenough, of London, for his paper on "The Sale of Gas;" and the Institution Bronze Medal to Mr. R. M. Searle, of Rochester, New York, for his paper on "High-Pressure Distribution in the United States."

A reception was given by the President and Mrs. Hunt on the Thursday evening at the Mansion House (kindly placed at their disposal by the Lord Mayor), which was greatly enjoyed by the large number of members and their friends who attended.

At the conclusion of the meeting, three alternative excursions were provided: (*a*) To Killarney; (*b*) to Glendalough; and (*c*) to Powerscourt Waterfall.

Amendment of the Conferences Act, 1885.—Further steps taken by the Council with the object of obtaining such an amendment of the Public Health and Local Amendment Conferences Act of 1885 as would legalize payment of the expenses incurred by members in the service of local authorities in attending the meetings of the Institution, resulted in an interview being granted by the President of the Local Government Board to a deputation of the Institution, which was introduced by Sir D. Ford Goddard, M.P. Mr. Burns gave the deputation a sympathetic hearing, but could offer no hope of legislation in the matter for some time to come.

International Committee on Photometry.—The second session of the International Committee on Photometry, at which the delegates appointed to represent the Institution were Mr. James W. Helps and Mr. Charles Carpenter, took place at Zurich, from July 18 to 20, under the presidency of M. Vautier; and a report of the proceedings has been printed and published in the Institution's "Transactions" for 1907.

Affiliation.—It is with much pleasure that the Council have to report that the North British Association of Gas Managers has during the past year become affiliated with the Institution.

The names of those appointed as representatives on the Council for the year 1907-8, were as follows:—

Eastern Counties Association . .	Mr. E. J. Brockway.
Irish Association	Mr. R. Bruce Anderson.
Manchester District Institution .	Mr. John Wilkinson.
Midland Association	Mr. Hubert Pooley.
North British Association . . .	Mr. Lawrence Hislop.
North of England Association . .	Mr. Thomas Hardie.
Southern District Association . .	Mr. H. W. Woodall.

Examinations in "Gas Engineering" and "Gas Supply."—The first examinations under the revised and new syllabuses which were drafted at the request of the Technology Committee of the City and Guilds of London Institute by a Committee of the Council, in conjunction with the Examiner (Mr. A. F. Browne), have been held; Mr. Browne acting as Examiner in the subject of "Gas Engineering," and Mr. J. H. Brearley in that of "Gas Supply." Mr. Browne having expressed his intention of relinquishing his position on completing the work in connection with this examination, the Council were invited by the Committee of the Institute to nominate a successor, and are glad to report that the President of the Institution, Mr. W. Doig Gibb, has kindly consented to accept the appointment.

Workmen's Compensation Act, 1906; *Coal Mines (Eight Hours) Bill.*—The Council next take up these subjects; but as the former was fully dealt with in the "JOURNAL" for the 3rd of March last (p. 539), and the latter in the next issue, it is unnecessary to reproduce this portion of the report.

Sub-Committee on Various Methods of Carbonization.—The Sub-Committee having in hand the investigation into the various methods of carbonization (Messrs. A. E. Broadberry, Charles Carpenter, Thomas Glover, and S. Y. Shoubridge) have so far directed their attention to ascertaining the conditions in gas-works where the highest yields of gas per ton of coal have been obtained. They have visited several works, and have carefully examined the plant and noted the results obtained from it, the quality of the coal used, and any special circumstances likely to influence the working. The information so obtained should be very useful in helping the Committee to their conclusions in the matter; but other important works have yet to be visited and observations taken before these conclusions can be embodied in a report.

In view of the great development of the vertical retort system which has taken place recently on the Continent, the Committee have requested Dr. Colman to make on their behalf a series of tests of the results which are being obtained from these retorts at Dessau and at other works in Germany. Dr. Colman and Mr. Broadberry have spent some days at this investigation, and it is hoped that their report will be forthcoming in time for the approaching annual meeting.

The Committee desire to express their acknowledgments to Mr. E. Körting, of Berlin, and his Directors for granting permission for the tests that have been made, and to the Directors of the Companies and the Engineers whose works have been visited for the assistance that has been afforded and for the courtesy which has been extended to them. Several engineers have done much to help the investigation by making tests, taking diagrams, &c.; and the Committee feel greatly indebted to them.

Sub-Committee on the Economical Application of Gas for Heating Purposes.—On the recommendation of the Sub-Committee (Messrs. John Bond, J. H. Brearley, and Charles Wood, with whom Professors Arthur Smithells, William A. Bone, and Julius B. Cohen, of the Leeds University, are kindly co-operating), Dr. Julien Drugman was, on Nov. 1, 1907, appointed as Research Chemist for the purposes of the investigation.

Under their direction, preparations for the research have been proceeding, and various experiments carried out. The following is the report of Dr. Drugman on the work relating to the six months since his appointment:—

The first requirements of the research were the designing and erecting of a special "combustion-room" in which the various stoves and other heating appliances could be tested in such a way that the experimental conditions should be under complete control of the operator without his having to go into the chamber. These conditions have, for all practical purposes, been realized in the combustion chamber erected in one of the rooms in Woodhouse Lodge, adjoining the new Mining and Metallurgy Buildings of the Leeds University.

Stove Combustion-Room.—This consists of a double-walled room built of tongued and grooved boards, the inner and outer walls being about 2½ inches apart. These are made as nearly as possible air-tight by a lining of calico coated with asbestos paint for the inside wall, and a thin coating of pitch, covered with white paint, for the outer walls. The floor, which has to bear the weight of the stoves, &c., consists of a layer of tongued and grooved boards made air-tight with painted calico. Over these asbestos board is laid, and on the top of this a sheet of asbestos-magnesia cement.

The room is as large as the available space allowed—namely, 9 ft. by 9 ft. by 9 ft.—and has an internal capacity of 710 cubic feet. Only one side is easily accessible, and in this side double doors, connected by an air-tight passage, give access to the interior without danger of

cold air suddenly entering. The rest of this side is fitted with shelves, both inside and outside, on which apparatus can be placed. Two windows are made just above the shelf, so that the apparatus can be watched from outside.

Air is admitted through movable panels at the top and back of the room, and the products of combustion are carried away through a square flue placed at the opposite end of the room near the ceiling. This flue connects with the chimney of the room—an ordinary kitchen chimney. As it is important that this flue should be quite air-tight, the inner lining is made of galvanized sheet-iron. To draw away the combustion products at a uniform rate, a small electric fan is used. It fits exactly into the outer end of the flue, and can be run either at high or low speed; being controlled by switches worked from outside the room.

Two electric lamps, also with exterior switches, light up the room, and two extra plugs have been put in, as it was thought that other lights, or a fan for stirring the air, might, at some time or other, be required.

Two holes have been drilled in the flue. In one, an electric resistance pyrometer is fixed and connected by four-way leads to a Callander recorder placed in the main buildings. By its use a continuous record of the temperature of the flue air is obtained. A simultaneous record of the temperature of the entering air is obtained by placing a thermograph outside the room. A glass tube, to draw off samples of the flue air, is fixed into the second hole in the flue.

The gas-supply pipe passes into the room through a panel, and is soldered on directly to a test-meter placed on a shelf outside the room. This in its turn is connected almost directly to the house-supply meter, so that the pressure is only very slightly influenced by turning on the gas in any other part of the house. So far no gas-governor has been put in. The pressure at the test-meter is measured by a water-gauge fixed into the meter over the water level, where its readings will be only slightly affected by the gas-flow. To facilitate calculations, it is graduated to read the pressure directly in millimetres of mercury.

The actual stove tests were very much delayed by unpunctuality in the delivery of the test-meters. The room was ready for use at the end of December; but the meters, which had been promised for the middle of January, were only received on the 20th of February. On testing, they were then found to leak in several places, and not to register gas passing through at low pressure, and accordingly had to be sent back to the makers to be overhauled. They were only finally returned on March 17.

In the meanwhile, the various methods likely to be used in the investigation were tested, and necessary apparatus installed and calibrated. Thus, in spite of the small number of data of actual experiments so far obtained, a good deal has already been done to ensure rapid progress in the work, now that the apparatus is ready.

The methods will now be described as briefly as possible. The details will be given more fully when the actual experimental results are discussed.

Measure of Air-Flow through Stove-Room.—It being impossible to obtain reliable measurements of the air-flow by the use of meters or of anemometers under the actual working conditions, a chemical method was adopted. The gas consumed is accurately metered, and a sample is taken from a neighbouring tap for an explosion analysis, from which the total volume of carbonic acid produced by the combustion of a unit volume of the gas can be calculated. This being ascertained, it is only necessary to find the percentages of carbonic acid in the incoming air and outgoing air respectively in order to estimate the rate of air-change in the room.

It is suggested that, to facilitate calculations with regard to the results of experiment, all gas-volumes shall be reduced to *dry* gas at 0° C. and 760 mm. pressure. (The result only requires to be multiplied by the factor 1·0543 to convert to gas-volume at 60° Fahr. and 30 inches pressure.)

Carbonic Acid Determinations.—Pettenkofer's method is employed, with the modifications proposed by Letts and Blake (*c.f.* Proc. Roy. Dublin Soc. 1900, p. 107). These consist in coating the inside of the vessels with paraffin wax to prevent the glass being attacked by the alkaline baryta solution, and carrying out the titrations in a vacuum.

The results obtained by the above method are also generally checked by a gravimetric determination, by drawing part of the flue air through weighed tubes containing calcium chloride or sulphuric acid and caustic potash. These results have generally been slightly lower than those obtained by Pettenkofer's method; but, on the whole, they do not differ seriously.

Ventilation.—The three movable air-panels that are provided, together with others between the windows in the side of the room, allow of great variations in the modes of air-admission. The floor, too, is so made that a clean hole, easily closed when necessary, can be made in it at any spot, and so air led directly to the stove without disturbing that in the room. The flue can also be closed more or less by a sliding panel.

Dryness of the Atmosphere.—Wet and dry bulb thermometers are placed inside and outside the room, to show the degree of saturation of the inside and outer air.

Comparison of Radiation Intensities.—A Reubens "linear" thermopile is employed, in conjunction with a sensitive single pivot galvanometer (that at present in use has been kindly lent by Mr. Brearley), to compare radiation intensities. The above will also be rendered available for quantitative determinations of radiation by standardizing by means of Professor Smith's radiometer. This consists essentially of a blackened copper surface of known area (formed of thin walled, square-sectioned, copper tubes laid close against each other), which absorbs the heat radiated to it, and gives it up to a water of known temperature (circulating through the tubes at a constant rate), raising this temperature by a few degrees.

Condensing Stoves.—Methods more specially to be applied to the examination of condensing stoves were next tested, as the determination of the hygienic efficiency of such "flueless" stoves was the first work undertaken.

The injurious constituents emitted, or likely to be emitted, with the burnt gases are sulphur oxides and carbon monoxide. Methods for determining these were therefore tested.

Sulphur Determinations.—The quantity of sulphur uncondensed in the stove gases could be easily calculated from the quantity of sulphur found in the condensed stove water, the sulphur contents of the gas burnt being accurately known.

In the determination of sulphur in coal gas by means of the ordinary Gas Referees' apparatus, there are two likely sources of error—first, by incomplete oxidation of the volatile sulphur dioxide; secondly, by contact of the hot parts of the apparatus with rubber containing sulphur. An apparatus has therefore been designed in which all the connections are ground-glass joints, and in which the combustion products are led over hydrogen peroxide solution and finally cooled by passing through a water-cooled condenser tube. The apparatus has, so far as it has been used, given higher results than the average of those obtained previously by the Referees' apparatus.

Carbon Monoxide.—Of the several methods proposed for determining carbon monoxide, that depending on the liberation of iodine and the production of carbon dioxide by the action of carbon monoxide on iodine pentoxide was adopted.

$$5\,CO + I_2O_5 = I_2 + 5\,CO_2.$$

There are, however, alternative methods of determining the quantity of change. First, the change in weight of tubes containing I_2O_5, and of reduced copper (to absorb iodine) was determined; but this method was found quite unsuitable here. The alternative of absorbing the liberated iodine, preferred by Mr. Brearley, who titrates the iodine formed, and by Dr. Rideal, who determines the iodine colorimetrically, seemed much more suitable. But, to reduce the number of solutions which would have to be prepared and frequently standardized, an alternative method, suggested by Gauthier—that of absorbing the carbonic acid in standard baryta—was preferred. The solutions already in use for the Pettenkofer determinations could then also be employed here.

Experiments with Condensing Stoves.—The general aim of the experiments was to determine the hygienic value of the stoves, more especially as regards the degree of pollution of the room air by sulphur oxides and carbon monoxide. The use of such stoves is limited, at the very start, to rooms in which there is an efficient ventilating system independent of any movement of air produced by the stove itself. Their use in ordinary living-rooms, as has been shown already by Mr. Brearley and others, is not to be recommended. This was shown in a rough way by lighting one of these in a stove-room with the door and flue open, but without the fan running. The atmosphere soon became very unpleasant to remain in. The conditions were, of course, intensified in such a small room as this; but the ventilation conditions reproduced fairly well those of an average small living-room.

Experiments Nos. 1 to 3 were carried out before the meters were fixed in. Their object was to find whether there was any constancy in the quantities of sulphur (and iron) found in the water collected from the movable tray of the stove during combustion. The cast-iron tray was replaced by a porcelain dish. On the whole, the proportions were constant within certain limits, but not sufficiently to justify calculation of the condensed sulphur from the quantity of water condensed during an experiment. The following were the results obtained:—

Preliminary experiment to rinse out the stove—

1 L. water contained	0·594 grm. S. and	0·92 grm. Fe.	

No. 1 . . .	1 L. contained	0·429	,,	,,	0·561	,, ,,
,, 2 . . .	1 L. ,,	0·396	,,	,,	0·051	,, ,,
,, 3 . . .	1 L. ,,	0·390	,,	,,	0·411	,, ,,
Average . . .		0·405	,,	,,	0·540	,, ,,

The liquid remaining at the bottom of the stove, and of which the above determinations represents the *overflow*, contained in 1 litre (1500 c.c. collected) 0·347 gramme of S. and 0·54 gramme of Fe.

The object of the other experiments carried out so far was to determine the proportion of sulphur present in the original coal gas which was condensed with the water in the stove. These are still being continued. The method of sulphur estimation in coal gas is also being checked by experiments in which known quantities of sulphur are introduced into the gas, and the sulphur then determined. These results so far point to rather large sources of error in the method generally employed.

The Sub-Committee, in continuance of the work deputed to them, propose to investigate as fully as possible such problems as are included in the following:—

1.—To make further tests on the condensing stove with an outlet-pipe fixed to carry off the products of combustion, and to ascertain the best methods of removing such products.
2.—To test under the above conditions the amount of carbon dioxide and sulphur dioxide escaping at the canopy.
3.—To ascertain the temperature and humidity of the atmosphere of a room at different heights from the floor-level.
4.—To determine, and, if possible remedy, the smell due to flame coming into contact with a cold surface.
5.—To determine the efficiency of the present steam-radiators; also to determine the best methods of removing the products of combustion, and to ascertain the loss of heat incurred by so doing.
6.—To experiment with different material to ascertain the best for radiating purposes for gas-fires.
7.—To experiment with radiating material to obtain the greatest amount of heating surface.
8.—To experiment with flames of various length to ascertain the best results when applied to different classes of fuel.
9.—To ascertain the best method of arranging radiating material with a view of preventing the checking of radiant heat-waves by the front bars or grating of the gas-fire.
10.—To experiment with high-pressure mixtures of gas and air for use with gas-fires.
11.—To test bunsen burners with the object of constructing one which is noiseless.

Fellowship in "Gaseous Fuel."—It will be remembered that in the last report of the Council reference was made to the establishment at the University of Leeds of an Institution Fellowship in "Gaseous Fuel," to the value of £100 per annum, which had been rendered possible by the formation of the special purposes fund. The Senate of the University, on the recommendation of the Board of Science and Technology, awarded the Fellowship for 1907-8 to Mr. Arthur Forshaw, M.Sc.; and the report received on the work he is engaged upon is as follows:—

> Since his appointment last October, Mr. Forshaw has taken up a very promising line of work on the relative "mantle" efficiency of carbonic oxide and hydrogen, which it is expected will elucidate many obscure problems relative to incandescent lighting, &c. His work so far has chiefly consisted in the designing of suitable burners, and in ascertaining the conditions requisite for obtaining reliable comparative results. Experiments are now proceeding, and a complete report of the conclusions arrived at will be presented to the Institution in due course.

Standard Clauses in Contract Specifications.—The Society of British Gas Industries having again approached the Council on the subject of standard clauses in contract specifications, a Sub-Committee has been appointed to further consider the matter.

Local Government Board and Artificial Illuminants.—The Local Government Board have appointed Dr. John Wade, D.Sc., to conduct an investigation into the "injurious gases evolved during artificial illumination." The Council, recognizing that this may have a distinct bearing on the gas industry, have offered, on behalf of the Institution, to render Dr. Wade all the assistance in their power.

Electrolysis.—A suggestion, which the Council have referred to the General Purposes Committee for consideration and report, has been made, that a Committee on Electrolysis should be appointed, to deal with the important subject of damage to mains due to electrolytic action.

Depreciation of Assets Charged to Capital Account.—The Council have received a deputation from the Institute of Municipal Treasurers and Accountants (Incorporated), on the subject of allowances for depreciation and wear and tear, for income-tax purposes, of the assets of municipalities represented by gas-works plant. The resolution of the Finance Committee, to whom the subject was referred, was adopted—viz., that it was a matter into which the Institution could not enter, for the reason that no uniform rate of allowance could be recommended for general acceptance, inasmuch as local circumstances and conditions vary so widely.

Library.—The donations to the Library received during the year are enumerated in an appendix to the report; and the Council desire to express their thanks for these gifts. A catalogue of the Library has been prepared, and was printed with the last volume of "Transactions."

Accounts.—The statement of accounts and balance-sheet for the year ended Dec. 31, 1907, duly audited by Mr. James L. Chapman, and Messrs. Wood, Drew, and Co., are also appended. Application for refundment of income-tax on investment dividends has been favourably received by the authorities; and the amount allowed appears in the accounts for the first time.

W. Doig Gibb, *President.*

May 29, 1908. Walter T. Dunn, *Secretary.*

BALLOON FILLING EXTRAORDINARY.

High-Pressure Gas Requisitioned.

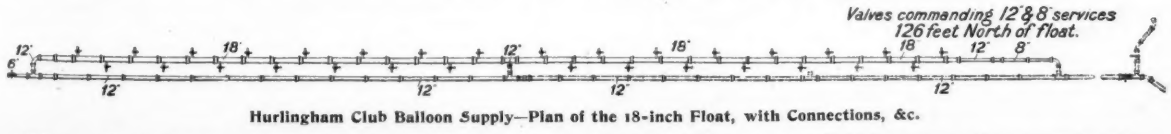
The history of ballooning has had another important event added to it; and its importance, in our opinion, adheres quite as much to the success of gas to cope with an unprecedented condition of things, as to the unprecedented number of balloons filled at one time, and put in competition with only three-minute intervals between. The scene of the great event was the Hurlingham Club grounds, last Saturday the day, and on the grounds was the large fashionable gathering that this Club and the Aëro Club can always command. On this occasion, the contest and the gathering were quite international in character. The Hurlingham Club are doing much to advance, increase in popularity, and maintain at a high level refined sport and recreation; and Major F. Egerton Green, the Manager of the Club, and his Committee intend that the name of the Club shall be perpetuated by achievement if not always marking record, at all events of an order that shall be of the highest merit.

Ballooning has entered the programme of the Club; and the first balloon ascent in its history and made from its grounds was that on April 29. During this season there are to be some notable balloon contests with the grounds as the starting-point; and for this new departure some elaborate arrangements have had to be made for the filling of the balloons with gas. For example, the great balloon race beating all records, in point of competitors, to which we have referred as having taken place last Saturday, had no less than 31 entries; and, as said above, this meant 31 balloons all to be filled simultaneously, and started at an appointed time with only three-minute intervals. This is balloon filling and racing extraordinary; and therefore extraordinary means had to be provided in connection with the gas arrangements for the purpose, and for future ascents and contests on the large scale.

Enterprise and thoroughness are of the guiding and animating principles of the Hurlingham Club; and not less so are they in these days of the Gaslight and Coke Company. When the Club discussed, in conjunction with the Aëro Club, the question of balloon ascents and contests on an unprecedented scale, they recognized at once that their plans must be subservient to the availability of the necessary supply of gas; and when one comes to consider that 31 balloons, having (say) a capacity of 60,000 cubic feet each, require to fill them simultaneously an available supply of close upon 2 million cubic feet of coal gas, it is an incidental order of a kind that all gas companies would not, and especially on a Saturday afternoon, be prepared to entertain. Moreover, the filling of balloons with gas is not, as some folk may think, a thing that can be done in any haphazard sort of way. They require skilful and well-defined treatment, or the end may be disastrous to the costly structures of caoutchouc varnished silk. However, the Gaslight and Coke Company took upon themselves the responsibility of the novel task; and to Mr. G. F. L. Foulger, their Chief Distributing Engineer, the work was confided. In the great district of London over the complex gas distributing arrangements of which he has executive control, Mr. Foulger has, under the peculiarities of London traffic and subterranean conditions, had some singular experiences in his time; and the requirements for ballooning on the Hurlingham Club ground is an addition to the record. Singular work of the kind is a matter in which he and his assistants delight; and, as we know from observation, into this he and Mr. H. S. Reeson and Mr. G. Marvin, two of the principal members of his staff, entered with enthusiasm.

Last Saturday's balloon contest has interested the world, and gas engineers will be interested in the arrangements made for the simultaneous filling with gas of the 31 balloons. The largest number that has ever been dealt with before at one time, so far as can be traced, in this country has been twelve, and in any country twenty-one. If any gas-works has exceeded these numbers, it would be a matter of interest to place the fact on record, with some account of the means by which the filling was effected. Extraordinary occurrences of this kind do not frequently occur; but when they do, it is useful to publish some particulars concerning them, not only for their current interest, but to have them on record for future reference and guidance. The Hurlingham Club grounds are near Putney Bridge; and to fill 31 balloons there from a district main was a matter of utter impossibility. The only way, therefore, that Mr. Foulger could see that the task could be successfully accomplished was by laying about a mile of 12-inch main which could be put under high pressure, and be used exclusively on the grounds for ballooning. Of course, this represented a somewhat heavy cost. To the leading aëronauts in this country, however, a place where a large number of balloons could be filled with gas simultaneously was a desideratum; and suffice it to say here that negotiations between the Hurlingham Club, the Aëro Club, and the Gaslight and Coke Company ended in satisfactory arrangements being made for the laying of this special main, and the constituting of the grounds of the Hurlingham Club a permanent centre for the balloon ascents arranged for by the two Clubs. In all probability on no future occasion will 31 balloons be sent up simultaneously; and therefore some of the work on the grounds requisite for last Saturday's ascent will not be required again. But sufficient of the arrangements will be left (the part shown by the dotted lines on the plan) to deal with, say, twelve or fourteen balloons at one time.

The nearest high-pressure main to the Hurlingham grounds that the Company possess is a 36-inch one, which is for the express purpose of conveying Beckton gas to the holders allocated for its storage at the Fulham station. To this high-pressure main, at the nearest convenient point about a mile distant from the grounds, the 12-inch high-pressure main has been connected up; and it runs westwards right into the centre of the Hurlingham Club grounds. Before describing the gas arrangements on the grounds, a pause may be made to say that the 36-inch main in the ordinary way contains a percentage of carburetted water gas; and this brings an interesting point into view. Water gas, being of a heavier specific gravity, is not so suitable as coal gas for ballooning. Therefore, special arrangements were made for the closing of valves in order to put nothing but pure coal gas into one of the holders at Fulham, which was specially set apart for last Saturday's event. And on Saturday this gas was sent down to the Hurlingham grounds at a pressure of from 60 to 66 inches. Having determined upon the means for obtaining the necessary



Hurlingham Club Balloon Supply—Plan of the 18-inch Float, with Connections, &c.

[The 12 and 18 inch pipes, laid temporarily on the ground surface, are shown in full black lines; the 12 and 8 inch pipes, laid permanently underground, are shown in dot and dash.]

supply of gas for filling the 31 balloons, the next question was the designing of the arrangements by which they could be filled simultaneously. The ordinary way is, of course, to simply have the balloons connected up to the end of a main in succession; but, in this way, the number must be very limited. The plan that Mr. Foulger devised and connected up to the 12-inch high-pressure main is that shown by the drawing. For the sake of designation, the top pipe is here called a float, and the bottom one the high-pressure supply-pipe. The whole of the float, and the black-lined portion of this supply-pipe are temporary, and special to last Saturday's requirements. The dotted pipe is to be permanent, and is laid underground. The float is 18 inches in diameter; and it has three connections—one 8-inch and two 12-inch—with the supply-pipe, which is a continuation of the 12-inch high-pressure main. The first connection with the 18-inch float from the 12-inch high-pressure supply-pipe is composed of lengths of first 8-inch pipes and then 12-inch; and the extreme end of the 12-inch supply-pipe is reduced to 6 inches, with a 12-inch connection off it with the 18-inch float. The valves commanding the 12 and 8 inch services are 126 feet north of the float. The pipes are laid on wooden blocks. Balloons, when inflated, take up a fair amount of space, and their swaying necessitates a safety space between them. For this reason, it was necessary that the float should be at least 200 yards long. From the float, there are 31 3-inch outlets—half on one side of the float, and half on the other, arranged in hit-and-miss fashion—and each outlet is controlled by a valve fitted with a wheel like a motor steering wheel, so as to enable the high-pressure gas to be dealt with exactly as required. The arrangement of the outlets alternately on each side of the float reduces the length of the latter to about half what would have been needed if the outlets had all been arranged on one side.

Those practised in the filling of balloons know the importance of having perfect control of the gas. Take one point as an example. At the top of the balloon, there is a safety-valve, which during the journey through space is under the aëronaut's control. Around this valve is a wooden framing; and to this framing are connected the cords which, when the balloon is inflated, form the network round the envelope. What is wanted is a fairly high gas-pressure at the start, which will lift this safety-valve instantly and level off the ground. It will readily be understood that, if only a low pressure is employed at the start, the safety-valve may not be lifted up level; and, if this is so, on the side that is raised the highest, there is a tendency for the fine whipcords to cut into the silk through the inequality of expansion thus created. There was on Saturday, as previously mentioned, in the high-pressure main, gas at 60 to 66 inches pressure; and, this being so, small wonder that Mr. Foulger was seen on the ground giving the filling of the 31 balloons his personal supervision. To deal with this 60 to 66 inch pressure, elaborate and careful calculations had to be made. Speed, velocity, and friction right from the Fulham end of the main had to be considered; and size of pipes and connections and every detail arranged accordingly, and so that there should be an equal pressure and volume of gas escaping at the point of outlet, while maintaining the high pressure in the supply pipes. This is where the value of the 18-inch float came in, with the three junctions of a reduced size from the 12-inch supply-pipe, feeding at the two ends and into the middle—all contributing to the maintenance of an equal pressure throughout its entire length.

This generally describes this novel piece of work; and we heartily congratulate all concerned in the success which attended the filling of such an extraordinary number of balloons simultaneously with such a considerable volume of gas. The filling started at 6.35 a.m. on Saturday, and finished at 2.40 p.m. (just over eight hours); nearly 2 million cubic feet of gas being requisitioned. The balloons were despatched on their journey at exactly three-minute intervals; starting punctually at three p.m. The only incident which caused some alarm was in respect of the last balloon, which ran foul of a very high tree, immediately after starting, and, by so doing, carried away with it a large bough of the tree, which became entangled in the netting.

Excepting this, which fortunately was limited to damaging the tree, no hitch occurred in the whole of the proceedings. The aëronauts generally expressed their satisfaction with the supply. Writes one independent observer: "It was simply perfect; and an immense credit to all concerned."

Elimination of Carbon Monoxide from Gas.—At a recent meeting of the Paris Academy of Sciences, M. Leo Vignon gave details of laboratory experiments on three methods for the removal of carbon monoxide from coal gas—viz., its conversion into methane by reduced nickel, its transformation into carbon dioxide by heating with oxide of iron at definite temperatures, and its direct absorption with cuprous chloride.

Wind Pressure on Roofs.—In an article on "Wind Pressure" in the current number of "Nature," the author remarks that until recent years it has been customary to treat the forces on a roof due to wind pressure as pressures affecting the windward side only; but he points out that, according to experiments on small models in a current of air, Mr. Irminger, of Copenhagen, has shown that there is a considerable suction effect on the leeward side of the roof, due to the eddies from the ridge. It does not, however, necessarily follow from this that the resultant effect on the leeward side of a roof must be a suction, as this will depend also on the pressure inside the building.

PRIVATE ENTERPRISE OR SOCIALISM.

THERE are to be found among the Council of the Industrial Freedom League (whose self-appointed task is the useful one of upholding the rights of private enterprise and combatting socialistic tendencies) very many well known and influential names; and this being so, it is to be regretted that the annual meetings of the League are not attended in a manner that would be likely to give a casual visitor a really accurate idea of the weight of opinion it represents. This year the meeting, which was held last Tuesday, at Caxton Hall, took place some six weeks earlier than usual, so as to avoid the holiday season; but the result, from the point of view of attendance, was in no wise a success.

The chair was occupied by Lord Lamington, who, in moving the adoption of the report, remarked that Socialism traded upon the sentiments, and appealed to the higher feelings of all, on the score of the great disparity of wealth and poverty, of misery and happiness, of different portions of the community. But at the same time, when put into practical effect, what it did was to pull down instead of building up. This was the essential difference between Individualism and Socialism. No attempt to create a permanent government on strictly socialistic principles had ever succeeded; and as it was not a new idea, it was to be presumed that it was not practicable, or else it would have been carried out. It had been tried by its most earnest enthusiasts, and had proved a failure. The usual idea of Socialism in this country, however, was simply despoliation. It was merely to divide the property of those who had acquired it. It sought to reduce all to one dead-level, and not to elevate all to a higher plane. But from his point of view the very principle of civilization was that of self-help, and at the same time trying to help others. The United States was an Individualist country; and it had advanced rapidly. Australia, on the other hand, had not made such quick progress; and he put this down very largely to the fact that the working classes there regarded it as part of their creed that the employer or property owner was inimical to the labourer's interest. This was one of the most harmful fallacies that could exist in any country. The object of the League was to expose the attacks that were being made in the name of Socialism or Municipalization. He did not believe England was in for such a big wave of Socialism as some people expected; at the same time there were many proposals brought forward nowadays that were fraught with great danger to the economic welfare of the country. One particular feature in connection with municipalization that he wished to allude to was the irresponsibility of those who had the dictation of the policy to be adopted by a municipality. A man elected for only three years might commit his town to an expensive scheme entailing serious loss on the ratepayers in the future. This was the one great differentiation between the men sitting on a local body and those who had a direct pecuniary responsibility in the controlling of a public company. After remarking on the way in which the electrical industry had been hampered and hindered in this country, he said his contention was that, so far as was consistent with the welfare of others, one wanted freedom of action for the individual.

The seconder of the motion was Lord Avebury, who is a never-failing champion of the cause which the League have at heart. He alluded to the questions of the London tramways and water supply. They would, he said, all remember the magnificent promises held out when the Water Companies were bought up. They struggled in vain against this step; and what was the result of it? There was a very good Water Board formed, against whom he had not a word to say, and who were fortunate enough to secure an excellent Chairman. But what he contended was that it was impossible for a public body to carry on a business of this kind as successfully as was done before. The result had been that in four out of the eight districts the ratepayers were already paying for their water much more than they previously did. Now they had another great Bill, which was to regenerate the Port of London; but he had little doubt that if it became law they would find before long that the ratepayers would be called upon to contribute to the port, or the port would become much more expensive than at present, or that both these results would follow. The League had done good work in Parliament in amending various Local Bills which proposed to take powers that would have been unfortunate for their localities. They used to say in this country that taxation and representation went together; but now it seemed to be thought that one set of people should pay the rates and others should spend them.

The report having been adopted, the election of the President (Lord Lamington), the Vice-President (Lord Avebury), and the Council was moved by Mr. S. Machin, who urged that the League should do more to counteract the socialistic propaganda that was now taking place especially in the poorer districts of London. Mr. Alfred Mosely seconded the proposition, and remarked that those who had not visited the United States could hardly realize the enormous progress made there, and how almost non-existent real poverty was in that country. As one who had been brought largely into contact with working men—Trades Unionists and others—he emphasized the absolute necessity for the League to take some steps to educate them. This might be done by securing lecturers who would be able to place the case before the working men in their own language and in their own way. It was useless to talk over their heads. Mr. Sampson, in supporting the resolution, and the need for something being done to combat "street

corner" Socialism, referred to a statement in the "Labour Leader" that there were 2000 meetings a week being held in London and the Provinces in support of Socialism.

The motion was carried, as was also another condemning the Housing and Town Planning Bill; and the meeting closed with a vote of thanks to Lord Lamington for presiding.

AN INSURANCE AND BENEFIT SOCIETY FOR FRENCH GAS-WORKERS.

We have previously referred to recent proposals to establish, in connection with the Société Technique de l'Industrie du Gaz en France, a mutual benefit scheme; and at the forthcoming annual meeting of the French Gas Society the matter will be further discussed. From a circular letter, dated May 22, from M. Coze, the President of the Provisional Committee considering the subject, we gather that the suggestion has already taken practical shape.

A "Société de Secours Mutuels" has been started under the patronage and care of the Société Technique du Gaz and the kindred organization of the Syndicat Professionnel de l'Industrie du Gaz. An accompanying note explains the objects and outlines of the Benefit Society, and the advantages it offers to managers, engineers, foremen, and employees of gas-works in France and her Colonies. It is pointed out that at about the age of 35 or 40, a gas-worker is interested in being assured of an increased capital from which he will be able to benefit later on, when he reaches a less active period of his career. He could effect this by investments or periodical payments; but his occupation makes it difficult, if not impossible, for him to study stocks and shares and to follow market fluctuations. In addition to the advantages offered by the ordinary assurances to obtain a certain sum at a certain time, participation in the Société de Secours Mutuels will ensure a very appreciable share in the benefits granted, as to brokerage, by the Assurance Company to the Society; and it will also permit of profiting, in case of need, by a part of the unattached resources of the benefit funds. This will be done by raising in anticipation from these funds, the amount required in time of difficulty to be advanced as a loan, equivalent, in whole or in part, to the premiums remaining to be paid. Thus the forfeiture of the policy will be avoided.

Different kinds of assurance have been examined by the Society, and the three forms adopted all dispense with any necessity of medical examination. The first, and one most recommended, is the assurance of payment of deferred capital, either with or without a return of the premiums in case of death before reaching the specified age. The former, which is the more advantageous, will enable a parent, in case of death, to provide for his children upon their attaining a certain age. The second class of policy is for the immediate payment of a life annuity, upon handing over to the Society a lump sum in purchase thereof. This, it is anticipated, will be rather an exceptional form of insurance. The third policy is for a deferred life annuity—that is, in return either for a lump sum or for proportionate premiums, after a certain time a given yearly or quarterly amount will be paid to the assured. Examples are shown of the first, and most recommended, policy, which will be made clear from the following figures:—

> Age of assured, 35 years; capital assured, 10,000 frs. (£400); duration of assurance, 25 years.
>
> The annual premium which the assured will have to pay is 253 frs. (£10 2s. 5d. nearly). This, for 25 years, amounts to 6325 frs. (or £253). By participating in the Benefit Society, he benefits by 244·44 frs. (£9 15s. 6d.) by reason of rebates on commission and brokerage. So that his total payment is reduced to 6080·56 frs. (or £243 4s. 6d.). Taking this from the amount assured leaves 3919·44 frs. (or £156 15s. 6d.) as the total sum gained by the policy holder.

The regulations of the Society have already been drawn up and circulated. Its objects are therein stated to be: (1) To make collective or individual assurances for the profit of the members, and (2) to assist participating members, and parents, widows, or orphans of deceased members. There are two classes of members—either honorary or participating. The former agree to pay an annual subscription, or a sum down of 200 frs. (£8), and do not share in the benefits; the latter participate in the benefits, and must be, as stated, a manager or other worker in gas-works in France or her Colonies, or a voting member of the Société Technique du Gaz; must be nominated by two members of the Society; have a three months' domicile; and pay an entrance fee of 10 frs. (8s.), and agree to take out an assurance policy with the Society. Regulations have also been framed for the management and financing of the Society, the provisional offices of which are those of the Société Technique du Gaz, in Paris.

Mr. Archibald P. Main (R. & A. Main), of Falkirk—according to last week's "Ironmonger"—in the course of a lecture to the members of the Falkirk branch of the Tariff Reform League, touched on an advertisement appearing in some papers advising people to make their own gas-cookers, the advertisers supplying the castings. These castings, Mr. Main pointed out, were made in the north-east of France, and were competing with British-made goods. He was told French moulders and fitters in the engineering trade were paid 50 c. to 55 c. an hour, or about 5d.

FRANCO-BRITISH EXHIBITION.

The Gas Section and the Lighting of the Grounds.

An inspection at the end of last week of the Gas Section at the Franco-British Exhibition showed that the suite of rooms was practically completed. There was still a little finishing work to be done in the way of fitting up—for example, the gas-operated laundry machinery; but this is all a matter of a day or two's additional work. Several of the rooms are quite completed, and look exceedingly dainty, homely, and serviceable, and demonstrate thoroughly how well gas lighting and heating have been, by the developments of late years, adapted to the most charming conditions of the dwelling-house. The billiard room at the time of the visit was not only completed, but a game of billiards was being indulged in. This was a source of great attraction, and caused many people to stop and examine the rooms. In view of the description of the fitting-up, decoration, and furnishing that appeared in the "Journal" on May 19, this reference will suffice for the present.

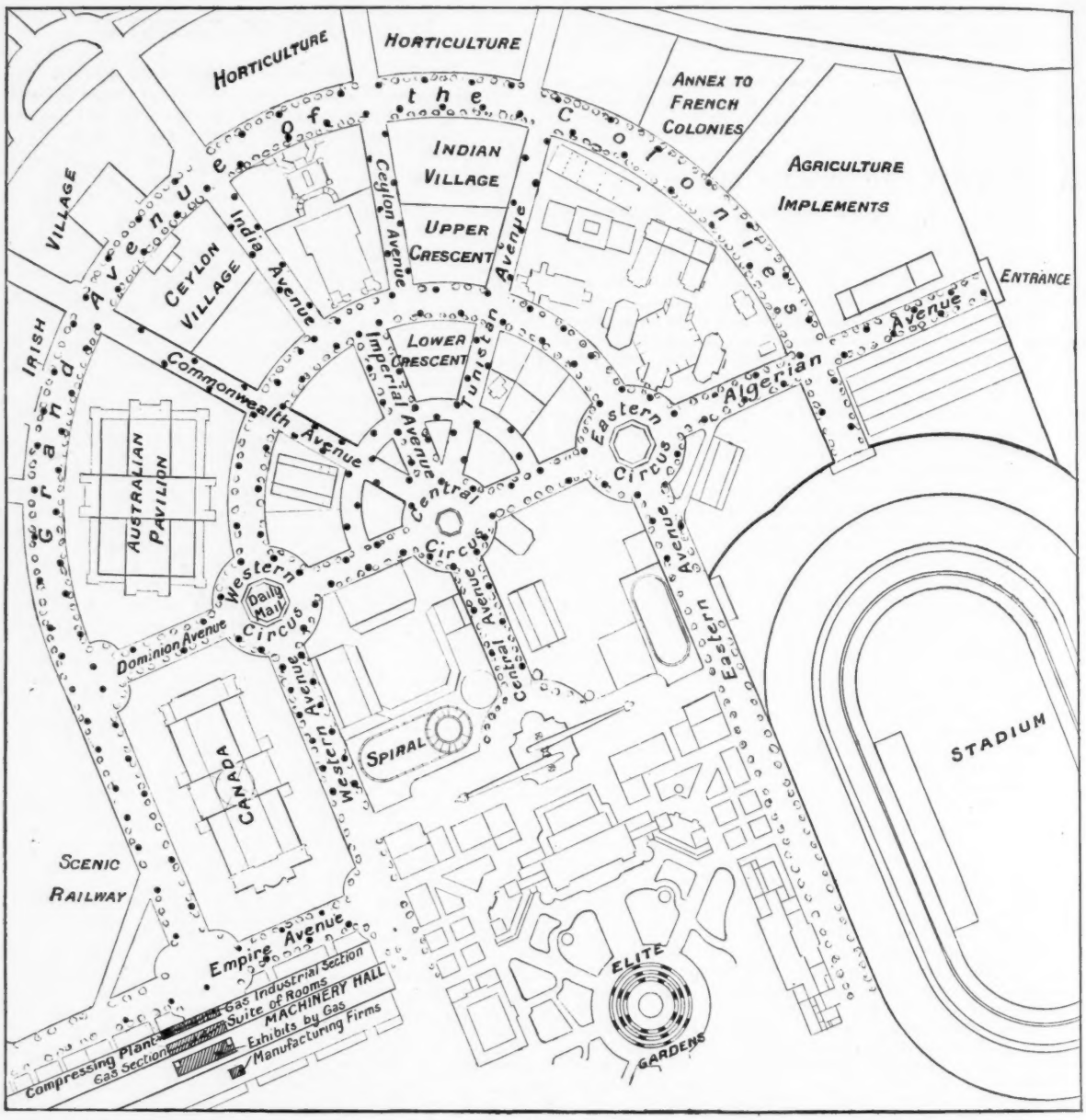
Progress has been made with the workshops, contiguous to the suite of rooms, and continuous with the space occupied by the gas-compressing plant of the Keith and Blackman Company; and the shops are now ready for their equipment. There will be something more to say when the whole exhibit has been perfected.

Meantime, the single-burner 1500-candle power Keith high-pressure lights—one on each side of the stand comprising the suite of apartments—are making the closely strung electric flame arc lamps look very "seedy." There is great disuniformity about the intensity and colour of the light from the flame arc lamps; and the sparkling high-pressure gas-lamps look brilliant among them. We have made inquiries as to what candle power is claimed for these flame arcs; and we can learn nothing definite—1200 to 2000 candles comprising the low and high extremes of the information. There is a little optical illusion about the high-pressure gas-lamps. When one stands admiring them from a distance, the mantle appears to be about twice the length that it actually is; being, as previously stated, only $3\frac{5}{8}$ inches deep by $1\frac{1}{2}$ inches diameter, and slightly bulbous at the lower part.

To-day we publish (p. 562) a plan showing the location in the grounds of the Keith new high-pressure 1500-candle power gas-lamps. The total number of these lamps is 230; and there is talk of possible extensions. But, without additions, it will be remarked that a considerable section of the grounds is illuminated by them. Visitors will remember that these lamps are only consuming 25 feet of gas an hour each; and it is interesting to learn regarding the maintenance that, notwithstanding the 55 inches pressure, the mantle renewals have only averaged five per day, or about $2\frac{1}{2}$ per cent. That is distinctly good in starting off such a large installation, and under conditions that are altogether new. Wandering about among the lamps, the impression may be that there is nothing exceptional about the light. The exceptional point is that such an illumination is being obtained on so low a consumption of gas. But where the lamps are in proximity to the electric arcs, there the judgment must be distinctly favourable to the gas-lamps. Standing in the Avenue of the Colonies at any point where there is a fairly open view of the high-pressure lighting, it is a striking spectacle. The illumination is excellent; and the lamps are alive with their scintillating and radiating effects. The illumination too is uniform; there are no dull spaces, and then a concentrated flood of light. It will be admitted from inspection, keeping in mind the facts, that nothing has been claimed by the makers of the lamps in excess of actual truth. They have so much margin in hand beyond any high-power electric lamps, that there is no need at all for prevarication. The only thing we could wish is that the Exhibition authorities had gone in for lamp-columns of a rather more ornate type.

With regard to the outlining of the buildings, domes, kiosks, and so forth, for spectacular purposes, the small electric carbon filament lamp, under inaccessible conditions such as we have here, has unquestionably an advantage over gas; but, in respect of general illumination, the lighting of the exhibition grounds—leaving out of consideration the profuseness seen here and there for advertising purposes—shows conclusively the superiority of gas. In some parts of the grounds where electricity is used for the general lighting, there is anything but a cheerful appearance—in fact, in places, a decided gloom reigns.

Turning once more into the Machinery Hall in which the Gas Section is located, the firms who have taken space have not all got into position; but there is no doubt that a few days will see a great change in this respect. Messrs. B. Gibbons, jun., and Messrs. Gibbons Bros. have a well-stocked stand, described last week; and just facing them the Laddite Mantle Company have brought together a very attractive collection of fittings showing their mantles on all sorts of burners—from high-pressure to ordinary vertical and inverted burners. Most makers' burners are represented here; showing that the Laddite mantle has a complete universality in application. The mantle-making requisites are at the stand; and in a day or two, it is hoped that actual mantle production will be proceeding. Another particularly interesting feature of the stand is the new "Metrolite" burner. There are about 100 of them round the top of the stand, spaced 14 inches apart, and clusters are in other prominent positions. The burners are made for use at all angles; and, particularly with their special fittings, they look most graceful. Another important point about them is that they are so constructed that



FRANCO-BRITISH EXHIBITION.—The Black Dots in the Plan show the Position of the 230 Keith 1500-Candle Power High-Pressure lamps, each consuming 25 Cubic Feet of Gas per Hour.

[In the left-hand Corner of the Plan, the location of the Exhibit of the Gas Engineering Committee will be seen. Between the India and Ceylon Avenues is the India Palace, the Tops of the Towers of which are illuminated by Gas, and the Interior by Inverted Gas-Lamps.]

the fittings cannot get tarnished. The burner indeed offers in all respects the nearest approach to the electric carbon filament lamp that we have yet seen. The Laddite Company are, at their stand, adopting the "follow-up" system; and gas companies and other agents will hear from them of any inquiries that are made by gas consumers in their districts regarding any of the exhibits.

The combined Electricity Companies have built picturesque rooms, in which to show the merits of electric lighting and heating. But, with all deference, we think they have made a mistake in building enclosed rooms. Some people have an aversion to being tempted inside a place, having visions of falling, in such close quarters, the victims of a pushing salesman; whereas, with open-sided rooms, they can freely inspect all that there is to be seen without running any such risk. We are advised not to hide our light under a bushel; and for exhibition purposes, it should not be hidden away in enclosed rooms.

THE VERTICAL RETORTS AT COLOGNE.

Herr Prenger, the Engineer and Manager of the Cologne Gas-Works, presented to the meeting of the Rhenish and Westphalian Association of Gas, Electricity, and Water Engineers, in February last, a communication dealing with the working of the large installation of Bueb vertical retorts at the Ehrenfeld works at Cologne. The communication is published in the last number to hand of the "Journal für Gasbeleuchtung," from which source we derive the following particulars of it.

The installation has already been described in the "JOURNAL" (Vol. XCVIII. p. 1000); but it may now be recalled that it is the largest installation of vertical retorts in the world. It consists of four benches, each comprising six beds of ten vertical retorts 4 metres (13 ft. 1½ in.) in length. Work was started with one of the benches on June 6 last, and a few days later a second bench was brought into use. These two benches were seen shortly afterwards by a representative of the "JOURNAL," and their working commented upon very favourably in our columns (*loc. cit.*). Herr Prenger deemed it advisable to delay starting work with the remaining two benches until he had had the working of the first two under observation for some little time. A short experience showed that the new plant was satisfactory, and in particular that the steam arising from the large quantities of hot coke suddenly discharged into the conveying trough was carried away without interfering with the workmen. The other half of the installation was therefore brought into action on Aug. 6 last, from which date the whole has been in continuous use. Herr Prenger now reports that there is no doubt that the settings have behaved uniformly well throughout the time. The shrinkage cracks in the retorts were not exceptional; and no large repairs have so far been called for. But, of course, it is too early to pronounce a definite judgment on the durability of the beds. The retorts are uniformly heated, and the heats can be regulated much more conveniently and rapidly than with horizontal and inclined retorts. The stokers find the work more agreeable. The lids have answered

well; the mechanism for opening and closing the lower door has not failed in any way.

Ruhr coal, derived from 13 different pits and mixed, has been carbonized in eleven-hour charges. Steam is passed in during the last two hours. Thirty retorts are ready for charging every two-and-a-half or three hours. These charging intervals have been chosen with a view to, on the one hand, distributing the work as uniformly as possible between the three eight-hour shifts of stokers, and, on the other hand, obtaining a good uniform mixture of gas from the different stages of carbonization. But trials have shown that this uniformity is not particularly essential for the working of the beds. The chargings may be run together, and thereby one shift of stokers dispensed with. There are required for the service of twelve beds, or 120 retorts, three shifts, each comprising: One man down below for discharging, one man above for charging the retorts, and one for charging and clinkering the producers. Thus the whole installation of 240 retorts requires 18 men per 24 hours; but there are also employed two men, working shifts of 9½ hours, for keeping the gas exit-pipes and the hydraulic main clear, and the retort-house clean. For comparison with other systems of carbonizing, there should also be included two men who are engaged on the coke conveyors and elevators; so that in all 22 men are employed on the installation per diem. It thus occurs that the daily make per man is about 154,000 cubic feet, compared with 66,400 cubic feet for inclines and 19,100 cubic feet for horizontal retorts. Moreover, the labour is less arduous with the vertical retorts.

The coals used at first caused troublesome thickening of the tar and formation of pitch in the hydraulic main and ascension pipes, and cleaning was necessary every second day. The deposits differed considerably with the coal and the heats used. Experiments were made with sprinkling the gas exit-pipes with such success that the plan was extended to all the settings. The longer pipes in particular then showed no appreciable tar deposits even after several days' working. The furnaces were clinkered every 32 hours—an interval which suited the general scheme of work; but they can be left for 48 hours if desirable. Water-cooled grate-bars are used to facilitate the clinkering, which then occupies about 50 minutes. The scurf is removed every 30 to 35 days, and occupies eleven hours in burning off; so that one charging exactly is missed. It is especially important to burn off the carbon regularly, as if there is much scurf the coke does not fall out of the retort at once. The working of the settings as a whole showed that they fulfilled the stipulated conditions as to productive capacity, but exact comparative figures with the work of the horizontal retorts were not thus attainable at first, owing to the gas from both descriptions of retorts having to go through the same apparatus and works' main. More exact figures were, however, obtained when an experimental works, comprising two beds of the vertical retorts, was put into action. The trials were carried out from the 11th to the 26th of January; and each lasted for 50 hours. Two of the trials were to show the conditions which prevailed in the regular working of the settings without the admission of steam; a third was similar, but steam was admitted to the retort; while the fourth was like the third, but steam was admitted for a longer time, and so more water gas was made.

The possibility of varying the proportion of water gas made is an important factor in the working of the new settings. Naturally the increased production of water gas can only be effected by an increased expenditure of heat—that is to say, by an increased consumption of fuel in heating the retorts. Regard has to be had, however, to the condition accepted at the present time that the gas shall have a gross calorific value of from 5000 to 5500 calories per cubic metre at 0° C. and 760 mm. (532 to 585 B.Th.U. per cubic foot at 60° Fahr. and 60 inches) and an illuminating power in the (Elster) argand burner of 10 to 12 Hefners at a consumption of 5·3 cubic feet per hour (8·10 to 9·75 candles per 5 cubic feet per hour). It has to be determined in each case whether it is more economical to obtain a relatively high yield of gas per ton of coal by prolonging the time during which steam is admitted, while at the same time increasing the expenditure of fuel in the furnaces, or to get a smaller yield while increasing the capacity of the settings through the shortened periods for working off the charges, and expending less fuel in the furnaces. The furnace fuel consumption should be compared on the basis of parts per 1000 cubic feet of gas made, and not per ton of coal carbonized. The results of the trials made are embodied in Table I.

TABLE I.

Duration of trial	50 hours	50 hours	44 hours
Admission of steam	None	8th to 10th hour	9th to 11th hour
Charge worked off in	10 hours	10 hours	11 hours
Total amount of coal used	25·35 tons	25·95 tons	20·40 tons
Coke used for heating, per cent. of weight of coal	15·60	17·28	17·23
Coke used for heating, lbs. per 1000 cubic feet of gas	29·90	29·01	28·08
Percentage of carbonic acid in chimney gases	18·70	18·48	18·36
Gas made per ton of coal, cubic feet at 60° and 30 ins.	11931	13069	13618
Specific gravity of gas	0·44	0·45	0·45
Illuminating power in argand, hefners per 5·3 cubic feet	14·30	10 98	9·50
Calorific value of gas, B.Th.U. per cubic foot at 60° and 30 ins.	575·4	553·1	547·3
Coke (dry) obtained, per cent. of coal	72·74	71·30	71·87
Tar and liquor, including scrubber liquor, per cent. of coal	21·62	17·30	14·04
Composition of the gas, vols. per cent.:—			
Carbonic acid	1·10	2·3	2·0
Heavy hydrocarbons	3·50	3·0	2·6
Carbonic oxide	8·90	12·0	13·0
Methane	28·74	26·2	22·9
Hydrogen	53·73	52·5	56·1
Nitrogen	4·03	4·0	3·4

The coal carbonized was a mixture of Westphalian coals as ordinarily used at the Cologne Gas-Works. Samples of the coal were taken at each trial, and their quality determined by analysis. On the average, the results were—

—	Trial No.		
	I. & II.	III.	IV.
Coal proper, per cent. by weight	85·78	88·32	84·03
Ash " "	11·32	9·23	13·24
Moisture " "	2·90	2·45	2·73
Gas " "	28·45	27·34	30·74
Coke " "	71·55	72·66	69·26

The coal proper had the following average composition:—

Carbon	85·32 per cent.
Hydrogen	5·45 "
Oxygen	8·02 "
Nitrogen	1·31 "
Sulphur	0·90 "

The calorific value was 13,025 B.Th.U. per pound.

The fuel used for heating the settings was cold coke derived from the vertical retorts. It was sampled and analyzed daily, and had the following average composition:—

—	Trial No.		
	I. & II.	III.	IV.
Combustible substance, per cent.	74·87	73·26	75·58
Ash (on the moist coke) "	13·01	15·52	11·52
Moisture "	12·12	11·22	12·90

Elementary analysis of an average sample of the whole gave the following results:—

Carbon	74·17 per cent.
Hydrogen	0·64 "
Oxygen	0·46 "
Nitrogen	0·86 "
Sulphur	0·79 "
Ash	10·49 "
Moisture	12·59 "

The coke had a calorific value of 12,622 B.Th.U. per pound dried, or 11,084 B.Th.U. in the moist state. The quantity used in heating the settings was carefully weighed, and the depth of fuel in the producer made the same at the end of each trial as at the beginning. It is quite clear from the table given that the fuel used in heating the settings rises with the introduction of steam if referred to unit weight of coal carbonized, but falls in relation to unit volume of gas made; and the latter is the proper criterion by which to judge the efficiency of the settings. Throughout the trials, the temperature in the interior of the setting was constantly observed. In the lower combustion chamber, it averaged rather over 1300° C.; at the middle of the height of the retorts, about 80° to 90° C. lower. The temperature of the spent gases was in the mean 550° C.; and the proportion of carbonic acid in the products averaged 18·5 per cent.

The tests of yield and quality of gas and of bye-products were made in an experimental gas-works adapted for a productive capacity of 140,000 cubic feet per diem and equipped with all the necessary apparatus for the tests. To this works either two units of the vertical retort installation, or eight units of the inclined retort plant, could be coupled up; so that the tests were made under identically the same conditions as in working on the large scale. The gas could be drawn at any stage into the laboratory for examination.

The results of the trials as shown in the table call for little explanation. The coke, of which the analysis has been given in connection with the furnace fuel, is harder and firmer than that from the horizontal and inclined retorts. The tar and liquor can either be run from any part of the apparatus into vessels for weighing, or collected in a specially-graduated tank. The yield of tar averaged 4·16 per cent. by weight of the coal carbonized, and analysis showed the following results:—

—	Tar from	
	Hydraulic Main.	Condensers.
Specific gravity	1·143	1·095
Water per cent.	3·000	1·500
Light oil (up to 170° C.) " "	2·000	5·300
Middle oil (170° to 230° C.) " "	11·000	20·000
Heavy oil (230° to 270° C.) " "	12·500	11·300
Anthracene oil (270° to 380° C.) " "	29·500	30·700
Pitch " "	42·000	31·200

The yield of ammonia was 0·256 per cent. of the weight of coal carbonized, or equivalent to about 22 lbs. of sulphate per ton. The gas after the washer contained on the average 0·15 grain of ammonia per 100 cubic feet. The sulphur averaged 14·6 grains per 100 cubic feet, as compared with 21·9 grains average for the last working year under the old system of working. The cyanogen in the gas at the inlet to the condensers amounted to 1·822 oz. per 1000 cubic feet, against 2·40 oz. under the old system.

In order to obtain a clear insight into the course of the distillation, and in particular into the effect of the admission of steam on the make and quality of the gas, an investigation was made similar to that carried out by Professor Bunte on the carbonizing chambers at Munich (see "JOURNAL," Vol. XCIX., p. 501). The whole ten vertical retorts were charged simultaneously, and allowed twelve hours for working off; steam at ½ atmosphere pressure being admitted from the 10th to the 12th hour. The results obtained from half-hourly readings are shown graphically in fig. 1. The make rises rapidly and continues tolerably uniform

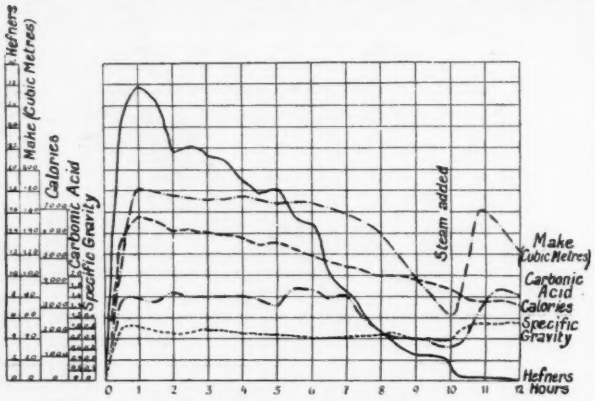


Fig. 1.—Carbonizing Results when the Whole of the Retorts are Charged every Twelve Hours.

to the sixth hour, then falls—at first gradually, but later rapidly. With the admission of steam it rises again rapidly nearly to its former high level, and falls off slowly in the last hour. Coal distillation proper is nearly completed in the ten hours. The illuminating power goes up to 28 Hefners (25½ candles), and then falls rapidly at first and later more steadily until, after steam is admitted, it becomes almost *nil*. The calorific power decreases fairly uniformly from 6800 to 3100 calories per cubic metre (325 to 723 B.Th.U. per cubic foot). The specific gravity of the gas rises to 0·5, and then falls to the sixth hour, from which time to the tenth hour it is fairly constant, at about 0·4—of course, then rising again when the water gas is made. The proportion of carbonic acid in the gas also reaches its maximum with the introduction of steam. Samples of the gas taken at the times stated were analyzed, with the following result —

—	Composition of Gas sampled at the			
	Eighth Hour.	Tenth Hour.	Eleventh Hour.	Twelfth Hour.
Carbonic acid . .	0·8	0·60	1·4	1·6
Heavy hydrocarbons	1·3	1·00	0 5	0·8
Carbonic oxide . .	9 6	10·20	37·6	40·0
Methane	13·2	7·94	0·8	1·2
Hydrogen	70·6	76·73	56·8	53·3
Nitrogen	4·5	3·53	2·0	3·1

It will be seen therefore that in the last hour only water gas pure and simple is produced.

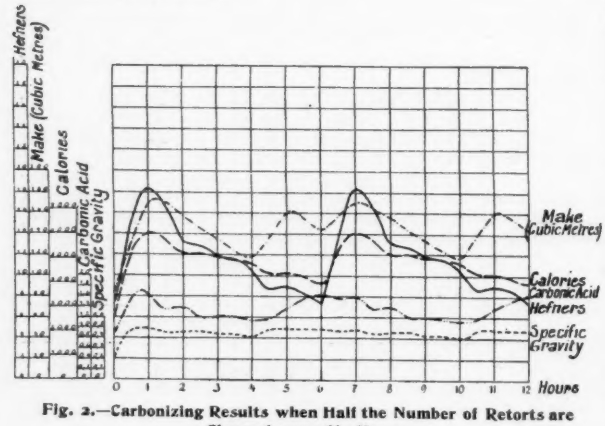


Fig. 2.—Carbonizing Results when Half the Number of Retorts are Charged every Six Hours.

Fig. 2 shows graphically the course of gas making when half the retorts are charged at first, and the second half six hours later—*i.e.*, five retorts every six hours; and fig. 3 the similar figures when a quarter of the retorts are charged every three hours. The latter is the practice now followed at Cologne. The last diagram shows that the result is a fair equalization of the varied relations; and, in particular, there is a tolerably uniform calorific power of the gas.

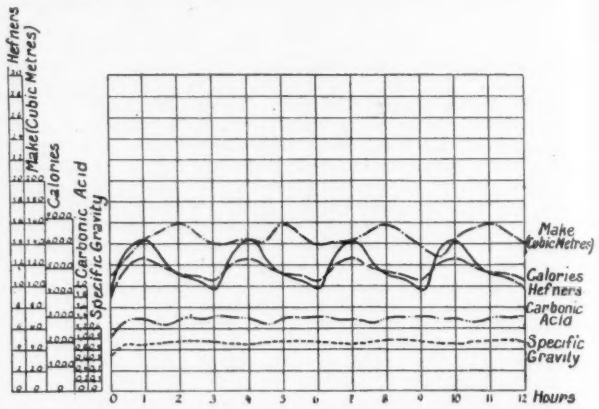


Fig. 3.—Carbonizing Results when a Quarter of the Number of Retorts are Charged every Three Hours.

When the output of gas to the district had fallen sufficiently for the old horizontal retorts to be put out of action, only the gas from the vertical retorts passed through the works' apparatus and station meter; and it was then ascertained that the results of working on the large scale closely tallied with those of the trials quoted. As already explained, eleven-hour charges are worked, and steam is introduced in the last two hours. It was found that the average daily output of the whole of the vertical retort-settings was 3,426,000 cubic feet, which gives 142,750 cubic feet per bed. The make of gas per ton of coal, with admission of steam, was 13,133 cubic feet. Its composition resembled that of the trial gas shown in the first table. The gross calorific power of the gas averaged 544 B.Th.U. per cubic foot at 60° Fahr. and 30 inches; and there was 1·97 per cent. carbonic acid in the gas. These observations therefore confirm, as a whole, the results of the special trials.

Gas Engineering Staff of the Bradford Corporation.—The appointment of Mr. Andrew Wilson, the Deputy Gas Engineer and Manager of the Bradford Corporation, to the position of Deputy Gas Engineer to the Australian Gas Company, to which reference has already been made in the "JOURNAL," has led to a reorganization of the engineering staff. Mr. E. J. Sutcliffe, formerly Manager of the Thornton Road works, and afterwards of the Birkshall works, succeeds Mr. Wilson; Mr. H. Akam, who has had charge of the Valley Road works since July, 1891, goes to Birkshall; and his place is taken by Mr. W. J. Dowse, who has been Manager of the Thornton Road works since May, 1900. This position will now be filled by Mr. Edward Gillett, who began at these works in 1893, and was for two years at the Mill Street works.

Underground Water Supplies.—In a paper read at a recent meeting of the Royal Society of Arts, on "Underground Water Supplies of the Thames Basin," Mr. Clayton Beadle said the time had undoubtedly come when a special and official inquiry into the question of water supply was necessary. Sir R. M. Beachcroft (then Chairman of the Metropolitan Water Board), who presided, remarked that the question of underground water was one of intense interest, because in London, especially in the City, people were talking of sinking artesian wells in order to avoid what were called the iniquitous charges of the Board. Of the water they supplied to 7 millions of people in Greater London 77·5 per cent. came from the Thames and the Lea, and only 22·5 per cent. from the wells and springs. It might be the time would come when all stores of water supply would be "grabbed," and more reliance would have to be placed on underground water.

The Late Mr. Robert S. Carlow.—The funeral of the late Mr. Robert S. Carlow, whose death on the 23rd ult. was recorded in the last number of the "JOURNAL," took place on Tuesday. After a short service conducted at the house of the deceased, as is customary in Scotland, by the Rev. Mr. MacLees, of Stirling, the remains were conveyed by rail to Glasgow, where a large number of mourners accompanied the bier to Sighthill Cemetery, the coffin being carried shoulder-high from the train to the funeral car by four gas managers. The service at the grave was conducted by the Rev. W. Wilson, of South Queensferry, and formerly of Arbroath. The following were the pall-bearers: Mr. William Carlow, brother, Edinburgh; Mr. Thomas Aitken, son-in-law, Arbroath; Mr. Charles Carlow, cousin, Leven; Mr. J. D. Smith, Stirling; Mr. W. Blair, Helensburgh; Mr. A. MacPherson, Kirkcaldy; Mr. A. Thomson, Inverness; and Mr. L. Hislop, Uddingston. A number of beautiful wreaths were sent by relatives and friends, along with one in the form of an Iona cross from the North British Association of Gas Managers. Mr. Carlow has left a widow and two daughters, one of whom is the wife of Mr. Thomas Aitken, coal merchant, of Arbroath.

HAVE YOU SEEN THE

DESSAU PATENT VERTICAL RETORT WHICH EFFECTS A REVOLUTION IN CARBONIZING

The Advantages claimed are—

It is Worked with Ease and without Discomfort.

It Produces a Maximum Yield of Gas for a Minimum of Labour Cost.

No Stopped Pipes.

No Naphthalene.

Reduction of Sulphur Compounds.

Good Tar.

Increased Yield of Ammonia.

Saving of Ground-Space and Cost of Retort-House.

This System has been for some time in use at the following Places:—

	Number of Retorts.		Number of Retorts.
Barcelona	150	Hamburg—Grasbrook	50
Cologne	240	Aschaffenburg	8
Dortmund	100	Halle a/d.S.	60
Duisburg	50	Dessau	60
Sölingen	30	Potsdam	48
Ludwigshafen	30	Berlin—Oberspree	48
Zürich	100	Berlin—Mariendorf	84
Düsseldorf	70	Berlin—Tegel	10

Other Installations are in course of construction as under:—

	Number of Retorts.		Number of Retorts.
Offenbach	80	Chemnitz	60
Brandenburg a/H.	60	Worms	30
Trieste	20	Potsdam (Repeat Order)	40
Elberfeld	120	Mariendorf (Repeat Order)	72
Frankfort—Bockenheim	120	Charlottenburg	70
Genoa	60	City of Berlin—Danzigerstrasse	240
Magdeburg	80	City of Berlin—Schmargendorf	80

The Dessau Vertical Retort Company (25, Schöneberger Ufer, Berlin, W.35) are now prepared to arrange for Installations of their System in the United Kingdom and Colonies.

For Terms and Particulars apply to the

DESSAU VERTICAL RETORT COMPANY,

c/o Mr. CHARLES HUNT, Consulting Engineer,

17, VICTORIA STREET, WESTMINSTER, S.W.

"DERBY" COOKER.

"A VERY CONVENIENT AND HANDY SIZE COOKER."

The following is a copy of a Testimonial received on the 10th April, 1908, from **J. D. ASHWORTH, ESQ., M.I.M.E.,** *Engineer and General Manager of the* **PORTSEA ISLAND GASLIGHT CO.**

"I have much pleasure in saying that the 'Derby' Gas Cooking Stoves, of which my Company have purchased **2355** since May, 1905, **have given EVERY SATISFACTION not only to my Company, but to the Consumers who are using them. It is a very convenient and handy size Cooker."**

FLETCHER, RUSSELL, & Co., LTD.,

Palatine Works, WARRINGTON.	130, Deansgate, MANCHESTER.	17, Islington, LIVERPOOL.	134, Queen Victoria St., LONDON.	20, Rue T'Kint, BRUSSELS.

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

Quarterly Meeting at Bradford.

The One Hundred and Fifty-Third Quarterly Meeting of the Institution was held at Bradford on Saturday, and was fairly well attended. The Committee had arranged for a saloon to be attached to the 9.25 a.m. train from Victoria Station, Manchester, and several members were picked up at intermediate stations to Bradford. On arrival, the party were met by Mr. Horace Geldard, the Chairman of the Gas Committee of the Bradford Corporation, and Mr. Charles Wood, the Gas Engineer and Manager. Before luncheon, the members were conveyed to Frizinghall, and inspected the Corporation's chemical works there, under the direction of Mr. S. W. Shepherd, who is now in charge of the undertaking. The following are some particulars of the establishment.

THE FRIZINGHALL CHEMICAL WORKS.

The Frizinghall Chemical Works of the Bradford Corporation, which are now under the management of Mr. Stephen W. Shepherd, were established about forty years ago by Messrs. Illingworth and Co., who were at that time the contractors for the tar and liquor from the Bradford Gas Company. In 1878, the works were sold to Messrs. Spence and Stewart, from whom they were purchased by the Bradford Corporation in 1884. Since that date, the works have been considerably extended, and the plant has been entirely replaced by modern apparatus. Sulphuric acid and sulphate and muriate of ammonia are manufactured from spent oxide and ammoniacal liquor.

The Sulphuric Acid Plant.

This has been quite recently extended, and is now producing 88 tons of sulphuric acid (100 per cent.) per week, of which 30 tons are used in making sulphate of ammonia, and the surplus is sent to the adjoining Corporation Sewage Works for the treatment of sewage. The furnaces, containing 62 ovens, are burning 48 tons of spent oxide per week, together with the sulphuretted hydrogen in the waste gases from the saturator.

The two Glover towers, 26 ft. by 9 ft. by 7 ft. and 26 ft. by 6 ft. square, are packed with "Metalline" bricks. Five chambers and three sets of intermediate towers, together with the various connections, give a total chamber space of 155,000 cubic feet.

The intermediate towers, and also the nitre absorbing towers, were designed by Mr. Wilfrid Wyld, the late Manager, in conjunction with Mr. Shepherd. The towers are filled with strips of glass, arranged parallel to each other, as the boards in a tower scrubber, except that each layer of strips is supported on the brick lining of the tower independently of the layers below. The intermediate towers condense about 20 per cent. of the acid, though their capacity is only about 1 per cent. of the total chamber space; there being an average of 26 square feet of glass contact surface per cubic foot of tower space.

There are two nitre absorbing towers, one 26 feet high by 5 ft. 4 in. square, and one 43 feet high by 4 ft. 6 in. square, containing 38 square feet of absorbing surface per cubic foot.

The acid for circulation is elevated by four Kestner's automatic elevators, using compressed air. The draught in the chambers is controlled by a Kestner acid-resisting exhauster, placed after the last chamber, capable of passing 2000 cubic feet per minute.

The Glass-Packed Towers.

The method above referred to of supporting or arranging the scrubbing material in towers or other apparatus used for the absorption, elimination, or condensation of any chemical vapours, formed the subject of a patent taken out last year (No. 8317) by Mr. Wilfrid Wyld in conjunction with Mr. Shepherd. Their specification states that their method is devised for towers and other apparatus packed with glass cross-pieces as hitherto used for the condensation of chemical vapours, such glass cross-pieces being supported at an angle to the horizontal plane upon ledges, projections, or openings formed in the brick supporting blocks in order to "obtain an increased amount of useful surface in a minimum of space."

Fig. 1 in the accompanying illustration, represents a sectional elevation showing a few courses of scrubbing material placed in position within a brick-lined casing, and fig. 2 a plan. The outer casing of the apparatus (which may be made of any suitable material and shape in cross-section) may be formed in any convenient manner, with the interior supporting walls built up to a suitable height above the bottom pipe connection in the usual way. In a tower (say) of square cross-section, upon any two opposite walls, consisting of wide blocks (such as bricks B, fig. 1) are placed a course of narrow bricks A, and upon the other two walls, at right angles, wider bricks or like blocks B are placed in the same course line. The narrow blocks A thus leave a ledge L, upon which are placed the requisite number of strips C, of suitable material to withstand the action of the vapours or liquids coming in contact with it; the strips being of sufficient length to stretch from wall to wall and to rest upon the ledges L. The strips may be placed vertically or inclined, and are of such a depth as to allow a space D between one series of strips and the next above, which may be at right angles thereto, or in any other direction—controlled by the cross-section of the tower.

In order to retain the several strips apart, there are inserted a number of what the patentees term "distance-pieces" E between the strips, so as to definitely secure a narrow, parallel, and equal space between the strips throughout their entire length—the distance-pieces being of suitable size, thickness, and shape to obtain the requisite area for the liquid and vapour space between the strips.

Fig. 1.

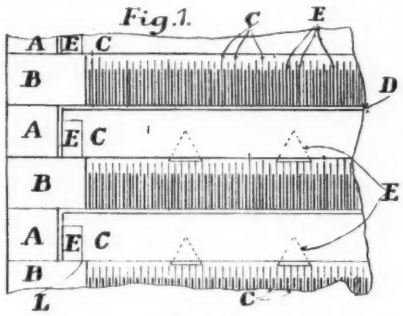
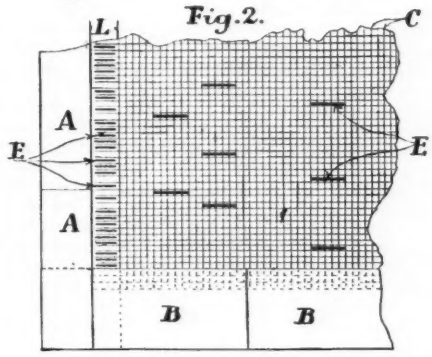


Fig. 2.



When arranging the interior of a tower as described, upon placing the first series of strips in position, a course of wide blocks B are laid upon the narrow ones A, and upon the wide blocks in the same course line, a course of narrow ones are laid to form ledges or supports L, for the next series of strips C, which will thus be at right-angles to the lower series, providing the horizontal section of the tower be square. The requisite liquid and vapour space between the strips is again formed with distance-pieces E, as before described, and the same procedure continued until the desired height in the tower is obtained.

The Ammonia Plant.

The ammoniacal liquor is brought by gravitation in pipes from the gas stations to an underground storage tank of 100,000 gallons capacity. The liquor, in its passage to the stills, is "pre-heated" by the waste saturator gases in three of Clapham's tubular heaters placed in series. The "free" still is 3 feet square, and, with the liming chamber, 16 feet high. This still is also the design of Messrs. Wyld and Shepherd. The "fixed" still is of Colson's type, with eleven trays, 6 feet diameter, and the "devil" water is distilled in a 4 feet Colson still, the gases from which are led into the bottom of the "free" still. Only part of the ammonia is used in making sulphate; the remainder being employed for muriate of ammonia manufacture.

The sulphate saturator is circular, with a conical bottom; and the salts are elevated by a steam discharger into draining tubs, and afterwards dried in a Broadbent's hydro-extractor, from which the salts are dropped through the bottom direct into bags attached to an automatic weighing machine.

The muriate of ammonia absorber consists of a closed tank of Yorkshire flags; and after neutralizing and settling, the resultant mother liquor is evaporated to super-saturation point in open lead evaporators heated by steam coils, from which it is run into shallow coolers to crystallize. The crystals are dried in a centrifugal machine, and packed in casks.

The ammonia plant is distilling 550 tons of liquor per week, making 40 tons of sulphate and 6 tons of muriate of ammonia.

At the conclusion of the visit, the members were driven back to the Great Northern Hotel, where they partook of luncheon; and the President subsequently took the opportunity of thanking Mr. Wood, Mr. Shepherd, and Mr. Percy Ward for their courtesy in connection with the visit made to the chemical works.

The Business Meeting.

The business meeting was held in the lecture-room of the Hotel. The President (Mr. T. Duxbury, of Oldham) occupied the chair, and was supported by Mr. T. Newbigging (Manchester), the Hon. Secretary (Mr. W. Whatmough, of Heywood), Mr. J. W. Morrison

(Sheffield), Mr. S. Glover (St. Helens), and Mr. Edward Allen (Liverpool).

The Hon. Secretary read the minutes of the last meeting; and they were adopted without discussion.

A Stricken Member.

The President said they had read a piece of bad news about one of their members—Mr. Elliott, of Leyland. Some three weeks ago, Mr. Elliott had a paralytic stroke, and he (the President) was sure the members were all very sorry to hear this.

It was resolved that the Hon. Secretary should be instructed to write to Mr. Elliott, expressing the regret of the members at hearing of his illness, and wishing him a speedy recovery.

Letters of Apology.

The Hon. Secretary read a number of letters of apology which had been received from members who had found it inconvenient to be present at the meeting.

Progress of Incandescent Lighting.

The next item on the *agenda* was the deferred discussion of the paper read at the previous meeting, by Mr. Thomas Newbigging, on "Incandescent Gas Lighting: A Word of Caution." The paper was published in the "Journal" for March 3 (p. 561).

The President said they were all pleased to see their old friend Mr. Newbigging with them that afternoon, and he would ask him to make a few observations by way of introduction to the discussion on his paper.

Mr. Newbigging, who was very cordially received, said he did not think many words were necessary from him by way of introduction. Most of the members present he imagined heard the paper read at the last meeting, and he hoped that those who did not had done him the honour of reading it in the trade journals. It was only a short paper, and it had been pointed out to him by a gentleman present that of the two papers to be discussed that afternoon one was by the youngest and the other by the oldest member of the Institution. This was really a curious coincidence. But there was a second coincidence. His was, he believed, the shortest paper they had had, while the other was about the longest. When he made his a short paper, he had in his mind the idea of encouraging more of the members who were usually silent to come forward if they had anything to say about a subject which was of interest, no matter in how few words it was put. What he said to them was, if they had any idea on a subject, let them put it forward in the shape of a paper, however short it might be. Some subjects did not necessitate or demand many words; and he hoped his example would be an encouragement to others. As to the paper itself, he had nothing to retract at the moment; and he trusted that there would be a full and open discussion on it. He asked the members to speak their minds, and not be squeamish. If they contradicted anything that he said, well and good; and he would see what he could do on the other side.

The President said that, while he agreed with Mr. Newbigging that the incandescent mantle had proved "a boon to the gas industry, outdistancing in illuminating value and in economy all other known means of obtaining artificial light," he felt somewhat inclined to differ with the statement that "the majority of gas consumers have not yet adopted it, neither is there an early prospect that its use by gas consumers will become universal." A remark like that, coming, as it did, from one in authority—as they all regarded Mr. Newbigging—would certainly have its effect; more especially with people outside their profession, who would not look upon it in exactly the same light as would gas engineers. In his own case, the few words from Mr. Newbigging had had great weight, particularly with some of the electricity people in Oldham. Well, as he had said, he was inclined to differ from Mr. Newbigging in this statement. Let them take Oldham, for example. Four years ago he would certainly have agreed with the paragraph; but not so now. Since that time, he must say that in his district the use of incandescent lighting—especially in mills and workshops—had grown enormously. In fact, there had been a wonderful increase in this respect; and he believed it was pretty well the case throughout the whole country. (Hear, hear.) This was one illustration for Mr. Newbigging that the flat-flame burner was giving way to the incandescent; and he had no doubt that other illustrations to the same effect could be given by others if they were required. (Hear, hear.) He (the President) believed the time was coming—had come, or was almost at hand—when they would see very few flat-flame burners in use in mills or workshops. There was another point he would like to mention in Mr. Newbigging's paper. This was that people would not go to the trouble of keeping their incandescent mantles in proper condition. There was no doubt that many consumers did not want to have trouble, but simply to have the mantle put on to the burner, and the light turned on as required. It was really disheartening, at times, to notice, when going about, the state of the mantles in use, and the dirty condition of the burners. As a remedy, Mr. Newbigging suggested the appointment of an outside superintendent, whose duty it would be to see to this, and instruct consumers as to the proper use of the incandescent system. He (the President) believed that some towns had already done this; and he thought it was a very important matter. In his opinion, they, as gas managers, ought to advise their respective committees to make such an appointment. At Oldham, the time had come for the appointment of such an official, for the bulk of the consumers did not know how to use the incandescent burner or how to obtain the best results from it. Great benefit, he was certain, would be derived from having someone to go round and show people how to secure better light from incandescent burners. There would then be fewer complaints about bad gas. They would, of course, have to make this official's time out of the ordinary—that was, he would have night duty, instead of day. There was no doubt whatever that gas consumers did require educating on the subject, particularly as the tendency was to have gas of a lower illuminating power. There were some people, however, who would not be educated—having the opinion in their mind that the gas engineers were trying something for their own profit in advising them to fit up the incandescent light on account of its superiority. He quite agreed with Mr. Newbigging that the reducing of the candle power of gas should be done gradually. There would be a great deal of trouble in reducing the illuminating power by 2, 3, or 4 candles before the consumer was ripe for it. They ought to lower the illuminating power as gradually as possible, and educate the consumer in the meantime to the use of the lower-grade gas. Personally, he thought they ought to supply coal gas of no greater illuminating power than 16 candles. Though by their Act of Parliament they in Oldham were not called upon to give more than 14 candles, they did not supply anything below 18 candles. This, he thought, was too high; and personally he should use every effort to bring it down to about 16 candles. But it was certain they would have difficulty with consumers and with their fittings. He had some experience of this about ten years ago. They had not then any plumbers' regulations, and nothing to compel the owner, the architect, or the builder to put in proper sized fittings. There was a case of a block of better class houses with from twenty to thirty lights; and in this particular instance it happened that the individual who had built the property was a member of the Gas Committee, and lived in one of the houses. This gentleman complained bitterly about bad gas; and an investigation was made. Then it was found that he only had a $\frac{5}{8}$-inch pipe from the meter for the supply of some 28 or 30 burners. The result was that he took the matter up; and they had now a code of rules and regulations for plumbers, so that every house built had fittings of the proper size, which were thoroughly examined before the plastering was done. A great many of the complaints about bad gas in mills and houses were attributable to the want of proper fittings. He was pleased Mr. Newbigging had raised this question about the appointment of an inspector whose duty it would be to advise consumers; for he agreed with him that consumers did require educating as to how to use gas properly.

Mr. S. Glover (St. Helens) took it that Mr. Newbigging, when he said the majority of gas consumers had not yet adopted the incandescent burner, meant the whole of the United Kingdom, and not any particular town. [Mr. Newbigging: Yes.] Because had this not been so he could have been supplied with particulars of many towns where the majority of consumers did use incandescent burners. He himself could have mentioned towns where the majority of the consumers had already been converted to the use of incandescent gas lighting. There was no doubt that the flooding of the country with burners and mantles of bad quality had had its effect in making some people abandon this method of lighting; but now that they had firms of repute supplying a reliable article, greater use would be made of it. He was not prepared to agree with Mr. Newbigging that the "fiat had gone forth that gas of low illuminating quality, and the universal application of the incandescent system, was to be the policy of the gas industry in the immediate future." He would like to know on whose authority this fiat had gone forth. He was quite willing to learn, but doubted the statement. He knew that in a great number of towns the gas authority were trying to induce consumers to have a lower standard; and it was a fact that it was from the richest gas they had the most complaints. He quite agreed it would be a good thing to have an inspector appointed to advise people as to the proper use of gas, and give instructions as to mantles and burners for incandescent lighting. If this were done, they would have fewer complaints, and the consumers would benefit by having a better light. Not only should there be inspectors to advise people as to the proper use of gas and the purchase of mantles and burners, but there ought to be depôts in different parts of the town where consumers could readily secure them. In this respect he was inclined to give encouragement to local plumbers.

Mr. J. H. Brearley (Longwood) said there was a considerable amount of advice contained in the paper. It was dangerous to give advice; and it was difficult to take it. But he thought the great majority of those present would not hesitate to take Mr. Newbigging's advice, because it did not apply to them. Take the question of educating the consumer as to the proper use of incandescent appliances. He thought they all did this already; but he certainly supported the suggestion that corporations who had not yet taken steps to advise consumers on the subject should be urged to do so. Since it appeared on the horizon ten or fifteen years ago, the use of incandescent lighting had been gradually extending, until now—and he challenged Mr. Newbigging's statement—it was a question whether there was not a majority of users in the United Kingdom of incandescent lighting, as compared with flat flame. In support of this, he would quote his own experience. He got the gas superintendent to ask the inspectors on their rounds to take, indiscriminately, a hundred houses of the annual rental of more than £12, and a hundred of under £12 rental, and put the query to the occupants, "Do you use the incandescent light in your living-room?" He meant by the "living-

room" the apartment in which they spent the greater part of their working hours. Of the houses under £12 rental, it was found that 95 per cent. of the occupants used the incandescent light, and of those over a £12 rental there was not a single case where it was not used in the living or dining room. He was of opinion that it would be a good thing if gas men could take a census by means of their meter inspectors as to the people in their particular district who had incandescent burners. He believed such a census would show that the majority of consumers had them. If after fifteen years of incandescent lighting they still had a majority of consumers who did not use it, the inference was not a pleasant one. Now, with regard to the lowering of the illuminating power of gas. He happened to be connected with a small works which, by an Act of Parliament of some fifty years ago, was only compelled to supply gas of the standard quality of 10 candles. This, he thought, was evidence—one more evidence—of the ancients imitating the moderns. It seemed to him they would be able by-and-by to take credit for instructing their ancestors as to the correct candle power at which to use gas. There was no doubt the tendency was to lower the standard, and therefore there was all the more need for instructing the consumer. The difficulty was to convince the consumer. If it could be done, well and good. The taking of the census he had mentioned could be done by the meter inspector having a separate column, in which he could enter the information as to whether or not the occupant of the house was using incandescent burners.

Mr. W. Whatmough (Heywood) said the system of having an outside superintendent to educate the consumer was adopted by his Council in 1902. Prior to the appointment, a canvass of the whole town was made; and it was then found that of the ordinary consumers 69 per cent. were already using the incandescent gas-burner; and of the prepayment meters, 36 per cent. They had in operation a system of monthly inspection. They inspected and cleaned the first six burners at 1d. per burner, and all above this number were at the rate of ½d. each. This only applied from Oct. 1 to March 31; and from the latter date to Sept. 30 the inspection was made once every two months. So that the consumer paid 9d. per annum per burner, in addition to paying for all materials used. With regard to mills and workshops, special facilities were offered, as competition with electricity was very keen. In these cases the Corporation undertook to clean and maintain the burners during the lighting season—paying monthly visits or when required—at the rate of ¼d. per burner; all materials being charged extra. Or, providing the installation was put in good order in the first instance, all liability was taken by the Corporation at the rate of 2d. per burner inclusive. The charge made to the ordinary consumer for mantles was 3d. each; and the Corporation supplied "C" burners, fixed complete with chimney, cone, and shade for 2s. The figures for the year ending March 31 last were not yet complete; but he could give those for the preceding twelve months. For the financial year ending March 31, 1906, they had seven mills and workshops with 494 burners, nineteen schools, chapels, and churches with 523 burners, and 435 dwelling-houses with 638 burners—a total of 461 consumers and 1555 burners. It worked out in this way: Loss on mills and workshops, £3 2s. 3d.; on schools, chapels, and churches, £2 8s. 6d. Profit on dwelling-houses, £3 3s. 7d.—leaving a net loss to the Corporation for the year of £2 7s. 2d. From the figures he had so far obtained for the past year, there appeared to be a falling off in the number of dwelling-houses on maintenance, though their inspector had done all he could in the way of educating the consumers. At the end of March last, they had nine mills and workshops with 694 burners, twenty-one schools, chapels, and churches with 631 burners, and 326 dwelling-houses with 499 burners—or a total of 356 consumers, with 1824 burners.

Mr. H. Kendrick (Stretford), like previous speakers, could not agree with the statement made by Mr. Newbigging that the majority of gas consumers had not yet adopted the incandescent burner. At any rate, it was not so at Stretford. As the result of a canvass made by the collectors and meter inspectors, there were in Stretford three years ago 91 per cent. of the gas consumers using incandescent burners. He did not say they were employed throughout the whole house, but in some part of it—principally in the living rooms. They had not yet come to incandescent lighting for bedrooms and cellars, but hoped to do so in the future. He believed if gas authorities could get rid of the idea of "injuring the plumber," they would witness a great development of the system, and the establishment of maintenance departments to the advantage of the consumer. One of the difficulties they had was that consumers were constantly changing. They started at Stretford four years ago a maintenance department; and he did not think they had now left on the books more than 15 per cent. of the original names. In their case, they sometimes did not make any charge for maintenance, by way of advertisement; and they had in this way a most effective answer to complaints about bad gas. If a consumer complained about the quality of the gas, he was asked, "What part of the district do you live in?" Having given a reply, he was asked, "Do you go to such a church or chapel in the district?" On the answer being furnished, the consumer was next asked, "Well, have you looked at the lights there?" "Yes," he would say, "and found them all right." "Very well, then," was the retort, "it is the same gas as you have." This, as he had said, proved the most effective answer they could have to the cry about bad gas. The result of the working of this department was about £36 loss on the twelve months; but he thought they were reaping their reward, for the consumption was going up by leaps and bounds. As to complaints of bad gas, it was also his experience that the richer the gas the greater the complaints. Formerly they supplied 20-candle power, but now it was 16 candles; and they had about one-fifth less complaints than formerly.

Mr. Newbigging, in reply, observed that his short paper had evoked a very good discussion. Most of those who had spoken agreed with what he had said; the only difference between them being in regard to the proportion of the consumers using incandescent and flat-flame burners. After what he had heard, he ought, no doubt, to be convinced that his estimate of the number of incandescent light consumers was too low. He was partly convinced, but not altogether satisfied. He hoped the remarks he had made would have the effect of causing a general census to be taken throughout the country in regard flat-flame consumers. He would ask those gentlemen who were in a position to stand up and say "Oh, I have 95 per cent. of incandescent light consumers in my district," not to ignore all the rest. But he must confess he doubted this 95 per cent. It might be that 95 per cent. of the gas consumers had tried it; but how many had continued with it? Were the 95 per cent. all going on now? He doubted it very much. It was his desire to put gas managers on the *qui vive*, owing to the competition of electric lighting. He said to them, "Do not depopularize your commodity in any way." Let them not forget what was going on in the supplying of electric current at a loss for the purposes of gaining consumers of electricity. It was quite time gas engineers were alive to these things. Some who had spoken that afternoon seemed to think he was not in favour of the supply of a high quality of gas, and was advocating a low quality. What he had intended to convey was not to overdo the thing. There was no need, if they wanted to scratch their heads, that they should pull the hair off. (Laughter.) There was no doubt that gas of high illuminating power produced the greatest number of complaints; and when he spoke of a low quality, he was thinking of gas of somewhere about 16 candles. This was what was in his mind, for he was convinced that the 16-candle standard was a very nice quality. [Mr. Allen: In ordinary burners?*] Any burner they liked, either incandescent or flat-flame. He believed his short paper, which, perhaps, was not correct in some things, had had the effect of causing some of the members to look into the question of incandescent lighting, in order to see to what extent it was being used. He repeated his belief that the incandescent system would become universal; but he did not want anything in the way of pressure—mistaken pressure—to be put upon the consumer. He had been so "humbugged" himself at times with bad mantles and burners as to feel disposed to go back to flat-flame burners. It was not always the ignorant consumer, therefore, who was left in the lurch.

Construction and Costs of a Concrete Gasholder Tank.

Mr. E. Frith (Runcorn) then read his paper on the above subject, which was published in the "Journal" for the 3rd of March (p. 562).

Mr. J. W. Morrison (Sheffield) said he noticed that the supports of the tank ran diagonally from the top to the bottom; and he was in doubt whether this was an advantage or not, as there was the danger of a bursting outward. He also would like to know if the £3 7s. 4d. per 1000 cubic feet of gasholder capacity, which the tank was said to have cost, included the cost of the ironwork for the inlet and outlet, because it seemed to him that, if it did not, the cost would be raised to £3 12s. 3d. Further, it must not be overlooked that in tank construction a great deal depended upon the character of the holder. If it was spiral, it would work out at a much larger figure. They had recently built one at Sheffield; and the cost was £5 per 1000 cubic feet capacity. Then Mr. Frith seemed to have been favoured in the matter of site, and had used very little timber. The cost of excavating formed an important item in the cost; and in this respect Mr. Frith had been fortunate in the construction of his tank. He asked Mr. Frith if the 497,000 cubic feet capacity was the working or total capacity.

Mr. Frith: Total capacity.

Mr. E. Allen (Liverpool), in the first place, congratulated the Institution on having a young member who had been able to bring forward such an interesting paper. It was a matter of pleasure to know that in Mr. Frith they had a worthy son of a worthy sire. The late Mr. Frith held a very honourable and leading place in the gas profession for many years; and they were glad to see that gas people would still have the honour of being served by a gentleman of the name of Frith. There was no doubt that Mr. Frith was favoured in his construction of the tank—for instance, in the storing of his materials (which was always an important point), and again in being enabled to take three years for the work. When work had to be done speedily, it made, as they all knew, a material difference in the cost.

Mr. H. Kendrick (Stretford) also argued that in the matter of a site Mr. Frith had been exceptionally favoured. If they added the cost of the extra labour which would have been involved by excavation on another site, it would work out certainly at £500, with a cost per 1000 cubic feet of £4 7s. 6d., instead of £3 7s. 4d.

* Mr. Newbigging asks for the following to be incorporated in his remarks: At this point Mr. Allen interjected the query: "What burner?" which, at the moment, I did not apprehend. Had I done so, I would have said: 16-candle gas as tested by the "London" argand No. 1, or 18-candle by the "Metropolitan" argand No. 2.

Then, as Mr. Allen had pointed out, very little timber had been used. It was, in his opinion, a little hazardous; but certainly it had come out on the right side. Had Mr. Frith had to put in ironwork, it would have made another serious item in the cost. If all these little items were added together, they would make a considerable addition to the cost.

Mr. J. H. Brearley (Longwood) desired also to congratulate Mr. Frith on his paper. He inquired if the cost of metal was included in the amount given, and added that it would have been a better guide had the paper included the exact quantities of cement used, and that kind of thing. Perhaps Mr. Frith at some future time would supply, through the technical papers, a statement giving these particulars, which would be of interest to those having to do with the construction of gasholder tanks.

Mr. J. H. Buckley (Formby) wanted to know what proportion of brick-bats and clinkers used came from the gas-works refuse, and if anything had been charged for them.

The President inquired if the sections of the tank were perfectly water-tight at the joinings.

Mr. Frith, in reply, said, with reference to Mr. Morrison's question, they did not run to the bottom, and only went down about 12 feet from the ground level. He admitted that, in the matter of a site, there was an advantage; but he did not think it was as much as had been made out. It was selected by his father, and might have been a bad one. He thanked Mr. Kendrick for his figures, as, after all, his tank came out very well in point of cost. The answer to Mr. Brearley's question about the iron was that the cost was included. It was from an old gasholder, and would have been sold at old-iron prices. It was included at these prices. As to his having three years to construct the tank, he wished to explain that the bulk of the work was done in the last ten months; the only expenditure prior to this being chiefly for cement. The brick-bats and clinkers use were obtained from the other works, and 1s. a ton was charged for cartage. Had they not been used in the construction of the tank, they would have been tipped away. In reply to the President, he might say the sections were perfectly water-tight. The joints were rebated, and the roughness of the concrete with the cement bound the sections firmly together. There was no question about their being water-tight. In the use of timber, no risk was run. If the ground seemed to show any sign of danger, they immediately had it timbered.

Thanks to the Authors of Papers.

On the motion of Mr. Morrison, seconded by Mr. Kendrick, cordial votes of thanks were passed to Mr. Newbigging and Mr. Frith for their papers.

An Appeal for the Institution Benevolent Fund.

The President made an eloquent appeal on behalf of the Benevolent Fund of the Institution of Gas Engineers. He said gas engineers were usually noted for their benevolence and large-heartedness; and, from information he had before him, he commended this fund to their generous support. He found that of the 800 members of the parent Institution only 126 were subscribers, and in their own district there were only 27 subscribers out of 150 members.

Mr. S. Meunier (Stockport) supported the appeal, and "started the ball," as he said, by handing in a contribution of £2 2s.

With the complimentary votes of thanks, the meeting concluded. The members subsequently had tea together.

MIDLAND ASSOCIATION OF GAS MANAGERS.

Meeting at West Bromwich.

The Spring General Meeting of the Association was held last Friday at West Bromwich on the invitation of the Gas Committee of the Corporation, conveyed through the President of the Association, Mr. Harold E. Copp, the Gas Engineer to the Corporation. The party assembled about eleven o'clock, and were introduced to the Mayor and other members of the Corporation, who were accompanied by Mr. Copp and Mr. Thomas Hudson, the Secretary of the Gas Department. An inspection of the gas-works was at once commenced; and the alterations that have been made at the works since the members of the Association visited West Bromwich in 1901 were indicated in a "Souvenir" of the visit which was distributed among the guests. Some particulars as to the works, together with a few photographs from the souvenir, are reproduced to-day. After the inspection, refreshments were served in a marquee erected on the lawn at the works; and several photographs of the members were taken. Brakes then conveyed the party to Dudley Castle, and on the return journey passed through Dartmouth Park to the Town Hall, West Bromwich. Luncheon was afterwards served in the Public Hall of the New Free Library on the invitation of Mr. J. E. Wilson, J.P., the Chairman of the Gas Committee. What transpired after luncheon will be gathered from the report of the proceedings with which this notice concludes.

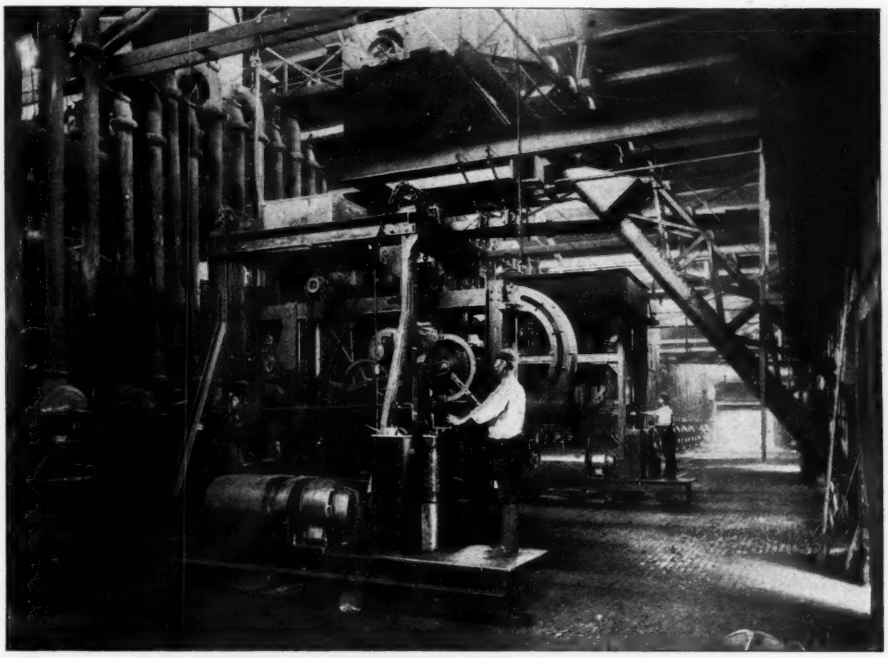
It may be remembered that the Albion Gas-Works of the Corporation were inspected by the members of the Association in May, 1901, during which year Mr. Thomas Glover, now of Norwich, occupied the presidential chair. On that occasion, the works were described in the "Journal." Though any further detailed description might be unnecessary, it occurred to Mr. Copp that a few notes, drawing attention to certain features which might possess special interest to the members, or which had been added since the former visit, would be helpful.

Retort-House, &c.—A complete set of hydraulic capstans and snatch-heads has been installed on the sidings, for the more convenient handling of the coal-waggons. The coal is emptied from bottom-door waggons into the shoots delivering into the coal-breakers on the west side of the retort-house, and elevated to an overhead hopper, whence it is fed into the De Brouwer charging machine. The coke is discharged by means of a "Jenkins De Brouwer" machine, either into the generators or on to the floor of the east side of the house. In the latter case, it is slaked by means of high-pressure water-jets supplied by a steam-pump at the south end of the house. The coke is then filled into tipping-waggons of 1 cubic yard capacity. A portion of it is taken to the north end of the retort-house and elevated by a hydraulic lift to a platform overhanging the canal basin, so that the waggons may be tipped into the centre of the boats. The remainder of the coke is taken to another hydraulic hoist (of the rope-geared type), by which the waggons are elevated so that the contents may be tipped into the coke-breaker and rotary screen, railway waggons, the coke-storage hopper, or deposited in the yard by means of the overhead gantry. The hydraulic pumping-engine and accumulator which operates the whole of the hydraulic plant on the works is situated in an engine-house adjoining the boilers, the accumulator being weighted for a pressure of 800 lbs. per square inch. On the top of the retort-stack there are three 8-inch retort-house governors. The retort-settings, with the exception of four (which are of simple generator type), are constructed on the Klönne regenerative principle.

Engine-House.—In the new engine-house is installed the generating plant for operating the stoking machinery. This consists of a 36-H.P. "National" gas-engine, specially constructed to use either coal gas or crude water gas. This is direct-coupled to a 28 kilowatt four-pole dynamo, generating current at a pressure of 230 volts.

Scrubber Area.—There is a device for vaporizing mineral oils for the extraction of naphthalene; the vapour being either admitted into the recently enlarged Livesey washer or into any other washers or scrubbers in which naphthalene may have accumulated—a few gallons of the oil being sufficient to remove any deposit of naphthalene which may occur. The washer for the extraction of cyanogen under the patented process of the British Cyanides Company contains two chambers, in the upper of which polysulphide of ammonia is formed, which gravitates into the lower one—the gas first passing into the latter. The washer, which has also been patented by the Company, is stated to be an extremely efficient apparatus; and when the liquor is at normal strength, the absorption of cyanogen, which has on many occasions reached 95 per cent., does not seem to be adversely affected by the presence of carbonic acid, which sometimes amounts to 2½ per cent. The gas next passes through a Holmes washer of 2 million cubic feet per day capacity, in which strong liquor is used to assist in the extraction of sulphuretted hydrogen and carbonic acid; the two Kirkham washers being used to remove the last traces of ammonia. In the scrubber area there is also the "Bruun-Lowener" water softener. The canal water is forced into this apparatus by means of a steam-jet; the purified water being finally stored in an adjacent tank. The water is reduced in hardness from approximately 55° to 4°, at a cost of 2¼d. per 1000 gallons. The softened water is then pumped either into the Lancashire boilers adjoining the engine-house or across the yard to the multitubular boilers at the water-gas plant—practically the whole of the scaling matter being removed.

Miscellaneous.—The purifier-shed and meter-house are lighted by means of tantalum filament electric lamps. The gas-engine and dynamo for the lighting circuit (110 volts) is installed in the basement of the retort-house. At the rear of the meter-house a small photometer-room has been built for the use of the foremen; the instrument being arranged in such a manner that very rapid readings may be made. In the water-gas building there has recently been installed a Peebles oil-gas plant of two retorts. A small quantity of blue water gas is introduced into the oil-gas retorts with beneficial results, considerably increasing the enriching value of the oil. The oil gas is injected by means of a steam-jet into the main stream of the water gas issuing from the scrubber. The cooling and scrubbing water for the latter is taken from the tank of No. 1 gasholder, and after passing through the scrubber is filtered and cooled before being returned to the tank. This holder is used for the storage of crude water gas. A third lift is being added to the No. 3 holder, which will make its total capacity a million cubic feet. The new lift is being added on the outside, and the inner lift will rise above the guide-framing.



The De Brouwer Machines in the Retort-House.

At the luncheon in the New Free Library,

Mr. B. W. SMITH (Walsall) proposed "The Town and Trade of West Bromwich," and referred to its commercial and industrial progress and the high position the town now holds among the manufacturing centres of the Black Country.

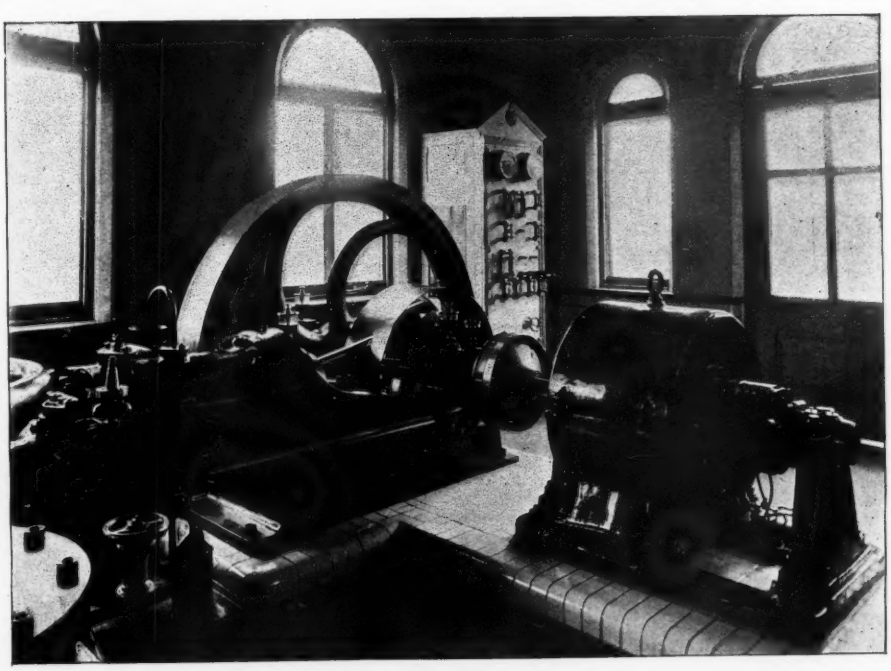
The MAYOR (Mr. J. Lawley), in reply, gave the members of the Association a cordial welcome to the borough, and trusted that their visit had been pleasant and profitable.

The CHAIRMAN (Mr. J. E. Wilson) next submitted the toast of "The Midland Association of Gas Managers." He said, as Chairman of the Gas Committee, he also welcomed the members of the Association to the town. He thought they would be convinced, after inspecting the place, that, for their size, the gas-works were perhaps the most perfect in the Midland Counties. He was happy to say the machinery they had put down to facilitate the manufacture of gas had fully realized the expectations the Committee and their worthy Manager had of it. He was also pleased to say the relations between the Gas and Electricity Committees were of the happiest possible description; and he hoped the harmony now existing would long continue.

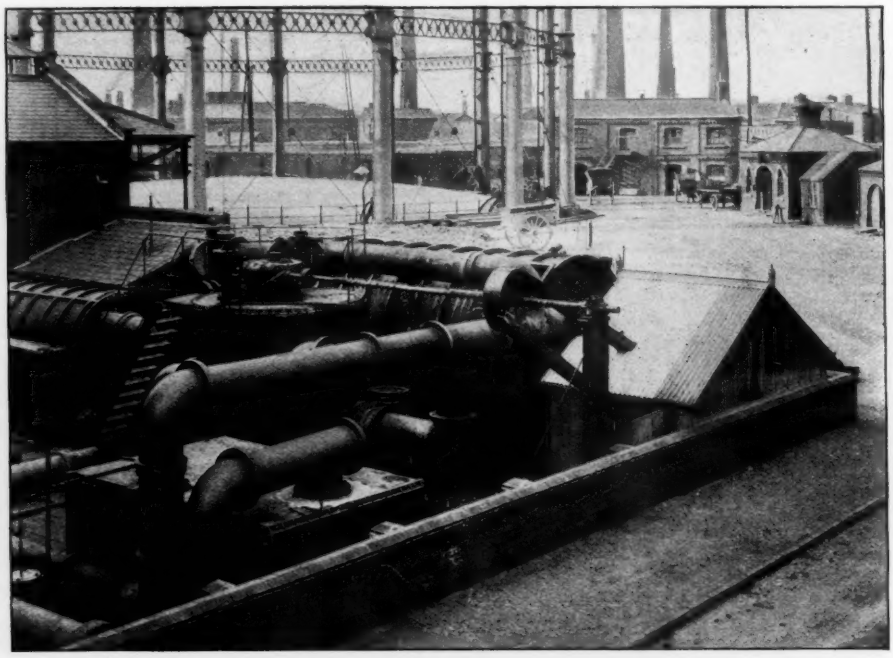
Mr. COPP, in responding, said the Institution of Gas Engineers had 750 members, and represented what was undoubtedly a very great and important industry. Speaking of the value of the Association he observed that the help they received from one another, coupled with the "Freemasonry" spirit that existed among gas engineers, was in a large measure responsible for the success of the industry. It had in recent years encountered a great deal of competition; but that of electricity had been a blessing in disguise. It had brought out the best side of the most capable men in connection with the gas industry, and had produced inventions and improvements which had been phenomenal. A good deal had lately been said, and some invidious comparisons had been made, about the relative advantages of municipal and company control; and no doubt there were a good many arguments in favour of each. He ventured to think, however, that in West Bromwich they had all the advantages of municipal control coupled with those of company control. They had seen enough at the gas-works that day to convince them that the Gas Committee were a very progressive body, and were also extremely enterprising. He expressed his gratitude to the members of the Corporation, to the Mayor, and to the Chairman and members of the Gas Committee, for the assistance they had rendered him in arranging the present proceedings.

Mr. THOMAS GLOVER (Norwich) gave in felicitous terms the toast of "The Chairman of the Gas Committee," which was very cordially honoured.

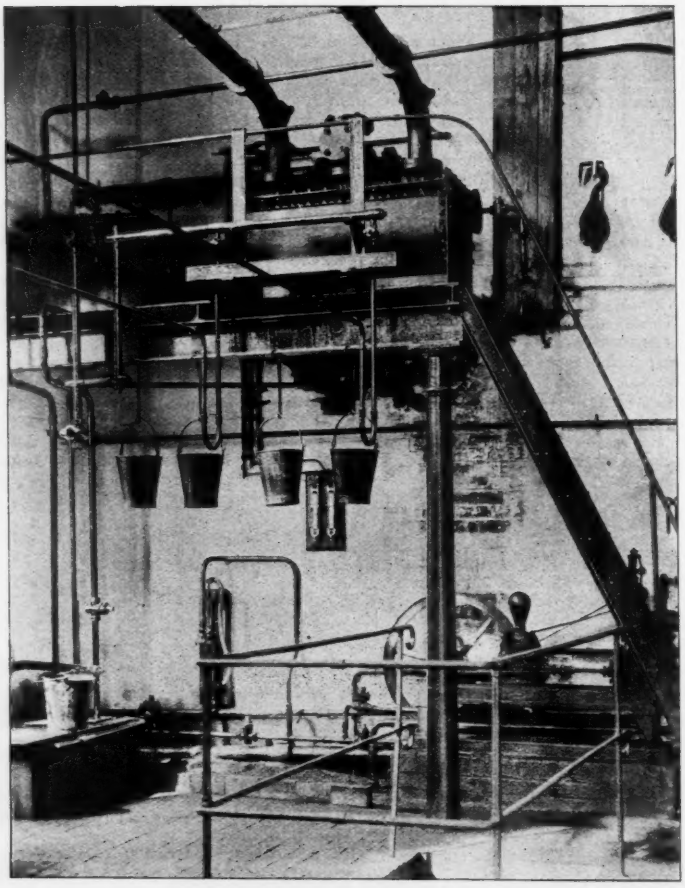
Mr. WILSON, in responding, said he had taken the greatest interest in the gas undertaking for the past eighteen or nineteen



The Electric Generating Plant for Working the Stoking Machinery.



The New Cyanide and Holmes's Washers.



The Oil Gas Plant (Peebles System).

years. He had watched the financial aspect of the concern; and he had made up his mind that, so far as he was able to influence the Council, whatever profits they made would, as much as they could, be allocated to the reduction of the capital account, rather than to the relief of the rates. What he wanted to see was the capital of the undertaking down to £100,000; and when this stage was reached, they would be able to do something more in relieving the rates, or probably in reducing the price of gas.

Mr. T. BERRIDGE (Leamington), in submitting the toast of "The Gas Committee," congratulated West Bromwich upon having one of the finest gas-works in the kingdom.

Mr. BROCKHOUSE (Vice-Chairman of the Committee) replied.

The HON. SECRETARY (Mr. C. Meiklejohn) announced the retirement, after 36 years' service, of Mr. Henry Hack, and in a few appreciative words proposed that he be elected an honorary life member of the Association. He said he had received from Mr. Hack a letter in which he wished the members adieu.

The PRESIDENT seconded the proposition; and it was carried. The congratulations of the members were also forwarded to Mr. Hack upon celebrating his birthday; it being remarked that Friday was his last day in the service of the Birmingham Corporation Gas Department.

The hearty drinking of the health of Mr. Thomas Hudson, the Borough Treasurer, submitted by Mr. S. GLOVER (St. Helens), brought the proceedings to a close.

The death took place on Wednesday last of Dr. D. Thompson, the Chairman of the Launceston Gas Company. He was one of the best known men in the district, in which he had a large medical practice, and filled the office of Coroner. Formerly he was a member of the Town Council, had been Mayor, and was a Magistrate. He was 76 years of age.

A feature of the "Birmingham Gazette" for some time past has been a series of articles entitled "Midland Captains of Industry." The issue last Wednesday contained the 65th article, which is devoted to the work of Messrs. C. & W. Walker, Limited, of Donnington, but more particularly to that of Mr. Alfred Featherstone, whose name is so closely associated with the firm, which he joined in 1873. At first he was engaged with Mr. William Walker in the conduct of the affairs of the London office; but in 1888 he went to Donnington to assist the elder partner in the management of the works, and eventually took entire charge of the concern as General Manager. On the conversion of the firm into a limited liability Company in 1899, he became Managing-Director—a position he relinquished about two years ago, but retained his seat on the Board. The vitality imparted by Mr. Featherstone into the Donnington establishment is evidenced by the epitome given of the works carried out by Messrs. Walker in all parts of the world during his active connection with them. Unquestionably, in the words of the writer of the article, Mr. Featherstone, "eminently practical, thorough, and conscientious, has been a powerful factor in the development of Donnington and its fame in the gas and engineering worlds."

According to Part I. of the General Report and Statistics of Mines and Quarries for 1907 issued on Friday, the number of persons employed in and about all the mines of the United Kingdom was 972,220, of whom 940,618 worked under the Coal Mines Act—an increase of 58,273 on the year 1906. The output of minerals under the Coal Mines Act was 282,104,141 tons, of which 267,812,852 tons were coal; adding 18,110 tons from open quarries, the total output of coal was 267,830,962 tons—an increase of 16,763,334 tons.

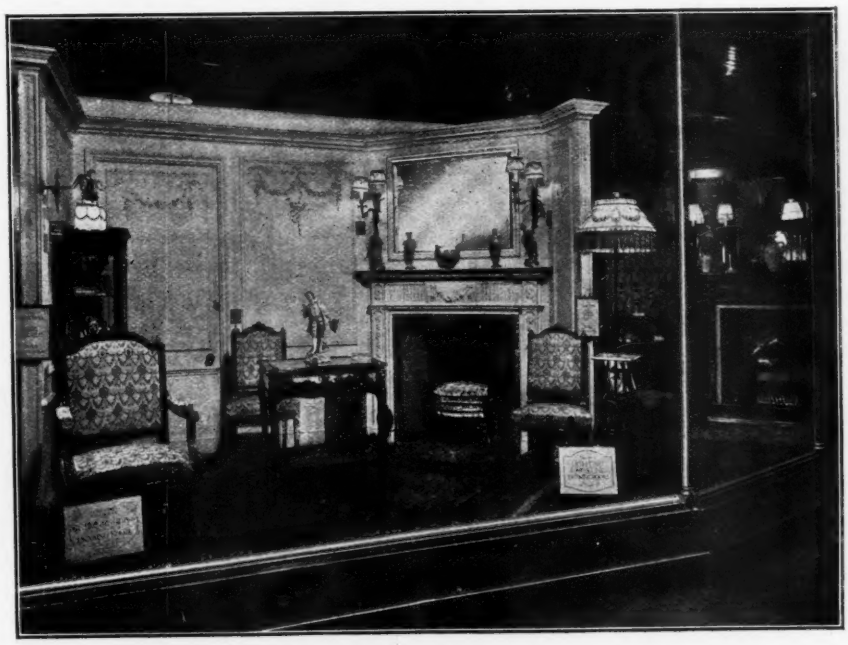
DEMONSTRATING THE USES OF GAS.

An Educational Display.

The Dining-Room.

In addition to the notice of the Gas Section of the Franco-British Exhibition which has appeared in the "Journal," and to that of the Earl's Court Gas Exhibition of 1904, we have on various occasions of recent times been able to record the fitting-up of suites of furnished rooms, on a more or less elaborate scale, for the purpose of demonstrating the use of gas in connection with exhibitions in different parts of the country. These displays have always been extremely popular; and their educational value must be almost impossible to over-estimate.

Everyone visiting the exhibitions where such suites are on view sees for himself, of course, of what gas is capable under the best conditions. But now, in order to gain this knowledge, it is not—for the wayfarer in Kensington, at least—even necessary to go to so much trouble as that. The reason for this is that the Gaslight and Coke Company have lately taken advantage of the magnificent window space which they possess at their show-rooms in High Street, Kensington, to make a display of the character we have referred to, which must inevitably arrest the attention of every passer-by who has eyes to see. This show-room has always been a model of its kind, and has contained (as was indicated by the photographs published in the "Journal" for Nov. 27, 1906) an unsurpassed assortment of gas appliances—in fact, one has been able to see there practically everything that has been arranged for the utilization of the lighting or heating power of gas. Hitherto, however, it has not, of course, been possible, with the innumerable varieties of cookers, fires, fittings, &c., shown, to afford visitors overwhelming proof as to the state of perfection to which gas stoves and fittings have—both from the point of view of use and ornament—been brought. Now this can no longer be said to be the case, for the set of six rooms, fully fitted up and furnished, which the Company show in their window offer undeniable testimony to the fact that a decision to employ gas for lighting or cooking, so far from entailing any sacrifice from a decorative aspect, enables the consumer to avail himself of some of the most beautiful appliances for both purposes that have ever been designed. For cooking, of course, and the heating of water, artistic considerations do not come in; but there are other factors in regard to which gas can lay strong claim to superiority. Indeed,



The Drawing-Room.

one wonders whether there is anything at all left in the way of lighting, or heating, or cooking that gas cannot now satisfactorily accomplish.

Though some detailed description of the fittings in the rooms arranged by the Company is given here, the photographs with which we have been favoured by the Chief Inspector, Mr. F. W. Goodenough, will certainly convey a better impression than any written explanation can do of the excellent effect that has been secured.

Two of the rooms face the main street—the kitchen and the dining-room—one being on either side of the entrance-door. First of all is the kitchen, which has a corner entirely to itself, and is completely shut off from the show-rooms, because of the steam given off from the hot-water apparatus shown in action. The fittings are precisely such as one would expect to find in a model kitchen; and here, as everywhere else in the suite, all that is exhibited is of the most up-to-date pattern. First to catch the eye is a large Richmond double cooker; and by its side is a coke-heated hot-water circulator. There is also a Wilson No. 2 circulator, capable of heating up to 50 gallons of water; and this is shown running all day on the bye-pass, by which means a small stream of nearly boiling-water is obtained. Both the top of the cooker

The Kitchen.

The Bedroom.

and the mantel-shelf above it are covered with tempting looking copper cooking utensils; and a fitted dresser, with a row of copper stewpans underneath, attracts attention. In the centre of the kitchen is a table, having on it a "Uno" coffee roaster and mill, by the Davis Gas-Stove Company; while on the floor is to be seen a numerous selection of Richmond, Fletcher-Russell, and Davis boiling-rings. Other items are a large Fletcher-Russell "Household" griller and a Richmond "Blackpool" washing boiler, which can be hired from the Gas Company at a rental of 1s. 9d. per quarter. The kitchen is lighted by means of a J. & W. B. Smith "Silva" three-light inverted lamp, a Podmore recuperative lamp, and a Sugg three-burner lamp. An excellent general effect is secured by the use of emdeca stamped zinc tiling, blue to dado height, and above that white up to about 6 feet from the ground. The whole of the fitting up was done—and well done—by the Company. The dimensions of the kitchen are 13 ft. 6 in. long by 10 feet deep.

Crossing to the other side of the entrance-door, the remaining rooms are reached; and here the decorative capabilities of both gas-lighting and gas-heating appliances are fully demonstrated, surrounded as they are by handsome furniture supplied (and changed periodically) by Messrs. John Barker and Co., of Kensington. All the interiors of the fire-places are of the Carron Company's manufacture; but the fires themselves are by different makers. It should be pointed out that the dining-room is on a corner of the building, and the other rooms lead from it down the

side; the whole occupying a space 50 feet long and 8 feet deep. It was not in this case thought necessary to partition the suite off from the show-room proper right up to the ceiling. As, however, it was intended to show all the fires in action, some method was needed of promptly removing the products of combustion; and this has been most effectually accomplished. A partition about 10 feet high was erected at the back of the rooms; and along the top of this there runs a double layer of asbestos, then lengths of 6-inch galvanized flue-pipe, with soldered joints, then two more layers of asbestos, and finally a covering of zinc. Junctions are arranged with the outlet for each of the fire-places; and by this means everything is kept absolutely cool. There is no condensation whatever; and the products of combustion are drawn out of the tube by the action of the ordinary ventilating fan in the show-room, and straightway carried outside the building. Should anything unfortunately go wrong with the flues, the panelling behind any one of the fires can be removed by simply taking out four screws. The lights in the rooms are all controlled by means of pneumatic switches fixed on the back of the partition, where there are also to be seen a varied assortment of gas-fittings—inverted, upright, "candles," and bijou—operated by "Norwich" switches.

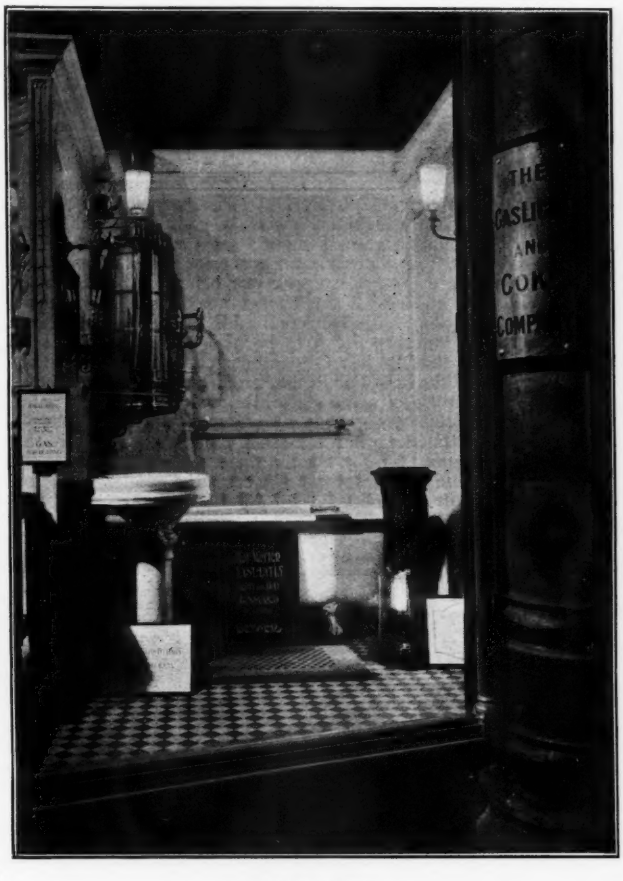
Taking first the dining-room, this is fitted in oak throughout, with green plush paper panels. The tiling of the fire-place is green; and the fire—a Richmond "Bavarian"—is enamelled to match this colour. The centre light (one of Messrs. Best and Lloyd's) is of an exceedingly handsome oxidized silver pattern, with red shade and two "C" burners. On the walls there are six bijou inverted burners, and three large ones, with globes in the Adam style.

In the drawing-room, the decorations are white; and in the fire-place is a Carron brass-ornamented dog grate (fitted up with a burner fire on the Tilley system), with a fender by the same firm. On one side of the room is a standard lamp, with a "C" burner, and an elaborate Empire shade; and this lamp is fed by a flexible tube, so that it can be moved at will to any part of the room. On the walls there are two pairs of "candle" brackets with Louis XIV. fittings, and a pair of Messrs. Messenger's inverted fittings of Adam design.

Next is the study, fitted in mahogany, and lighted by three Dutch style inverted oxidized silver brackets, and four "candle" lights, by Messrs. Benson and Co., coming from the centre of a mirror fixed over the mantel-shelf. The fire-place is an armour bright recess, having fitted in it a Davis No. 57 "Diamond" fire in polished steel. In this room there is also an onyx table-lamp, very massive in design, with a "C" burner and Empire shade to match the decorations. Like the one in the drawing-room, it has attached to it a flexible tube.

Coming now to the bedroom, the decoration is in pink and white. For the illumination of the dressing-table, there is provided a Best and Lloyd "Surprise" pendant, with a green silk beaded shade; and there are in addition two pairs of polished brass Dutch "candle" brackets, by Messrs. Benson. In a green tiled recess, faced with white marble, is a Fletcher-Russell "Rustic" fire, in green enamel.

The last room of the suite is the bath-room, in which there is fitted one of Messrs. Ewart and Son's "Califont" water-heaters. This is automatic in its action, and can be arranged to supply water at any part of a house. The cold water entering the heater displaces a valve which turns on the gas; and the water is hot almost immediately it commences to flow from the tap at which it is being drawn. The room, the floor of which is tiled, is heated by a Richmond green enamel "Surrey" condensing stove. There is noticed here an ingenious gas-fitting, which can be utilized for several purposes—for lighting, for boiling shaving water, and for heating a pair of curling-tongs. The two latter operations are performed on a bunsen burner, which is under entirely separate control, and is fitted on the first of the two arms of the bracket.



The Bath-Room.

On the partition at the back of the rooms is fixed a chameleon sign lighted by an incandescent burner, and kept in action by means of the heat ascending from the chimney. The legend it bears is a telling one, and may fittingly be quoted in concluding this reference to the attractive show which is being made by the Gaslight and Coke Company: "Gas-fires save labour, trouble, dirt, and money. Doctors use and recommend them."

A NEW CITY GAS-STOVE SHOW-ROOM.

The Cannon Iron Foundries, Limited.

EVERY show-room for the appliances of a particular maker of stoves or fittings, if situated in a central thoroughfare, and more especially if possessing the advantage of good window space, must serve as an advertisement for the use of gas in general, as well as for the specialities of the firm whose wares are exhibited; and therefore the more of them there are, the better it is from the gas supplier's point of view. Bearing this in mind, it is a pleasure to be able to record the fact that the Cannon Iron Foundries, Limited, have recently removed their show-rooms to No. 18, Holborn Viaduct, on the ground floor of which they have ample scope for showing their well-known cookers, fires, and other goods to the best possible advantage, and also of drawing the attention of the passer-by to the uses of gas. In any event, such premises as these would to an extent fulfil the purpose of a gas company's show-room; and in this case, as in other similar instances in their district, the Gaslight and Coke Company have carried the idea further by arranging to make the show-rooms practically a depôt for themselves. A varied selection of their fittings will be displayed; and in addition the firm will receive messages of all kinds on behalf of the Company, and promptly transmit them to the proper quarter. A special feature will be a high-pressure gas lighting installation outside the premises, for which, as they are not on the route of the high-pressure main, compressing plant will be put down. This is an arrangement which is to be much commended; for at present Holborn stands greatly in need of an effective display of outside gas lighting. It is true that there are a number of electric lamps to be seen; but though Holborn Viaduct is admittedly one of the very finest thoroughfares in London, many people also consider it is one of the worst lighted. The majority of the places of business close early; and their lights are then, of course, put out.

It may be mentioned that, in addition to the show-room, the Cannon Iron Foundries have ample basement accommodation, where a stock of the smaller goods is kept ready for prompt supply. It is, however, with the former portion of the premises that we are mainly interested; and here there is to be seen a varied assortment of the heating, cooking, and lighting appliances manufactured by them, as well as samples of their ordinary and prepayment meters. We learn that a huge business in radiators has been done by the firm in London this year; and in order to satisfy the inquiries of prospective customers, over a hundred persons to whom these radiators had been supplied were written to, asking if they were pleased with them. Out of the whole number, there were only about four instances in which trouble had been experienced; and even in these cases it was only a question of small details, which were very soon put right. The radiators are made in three heights—39, 32, and 26 inches—and, of course, any number of tubes can be had, though the sizes listed are from four to fourteen. With each one there is supplied free of charge a white enamelled cast-iron base, which gives a neat appearance to the whole thing.

In looking round, there are many things to take the attention, some of which will appeal to one person, and some to another. There is, for example, a boiler, the chief feature of which is that every drop of water can be drawn away from it—this being accomplished by fixing the tap close to the bottom, which is corrugated. In the window and on each side of the room, fires are shown fitted into chimneypieces which are supplied by the Company. In this way, it need hardly be said, the fires are seen

at their best. There are also on view some condensing stoves; and these are furnished with enamelled interiors. This, it is pointed out, besides assisting the condensation, adds many years to the life of the stove. Of the cookers, there is the "Hercules," which has for a long time been extensively adopted by gas companies for hiring out, and the later pattern, named the "County," which has several up-to-date features to recommend it. These cookers are fitted with the Company's combination grilling and boiling burner, which is cast in one piece, and needs no mechanical contrivance to work it. The only item of maintenance is the plate which the burner surrounds, and which is made of cast iron, has a life of about twelve months, and costs only 4d. to renew. The burner consists of two rows of holes, controlled by separate taps; the upper one being for boiling, and the lower one for grilling. It may be mentioned that this arrangement is fitted by the South Metropolitan Company to their own pattern stoves. Another detail to be noticed (and one which was suggested to the firm by a Colonial gas company) is a detachable extension of the hot-plate of cookers, which can be fitted on either the right or the left hand side of the stove. Where there is space to spare for it, this is an advantage, as it furnishes standing-room for saucepans, &c., that do not for the moment require to be over the burners.

For the other items of interest to be seen, the reader must be referred to the show-room itself.

GAS LIGHTING AT THE SCOTTISH NATIONAL EXHIBITION.

By W. R. Herring, M.Inst.C.E.

When the statement of tests of various lamps used at the Edinburgh Exhibition were published a few weeks ago (see p. 358), I was not able to include among them the tests of the Vesta-Graetzin high-pressure inverted lamps, which, through the instrumentality of Messrs. Falk, Stadelmann, and Co., I had arranged to erect at the exhibition, owing to their not having come to hand in time. In view of the visit of the Institution of Gas Engineers to Berlin, where I understand that some of these lamps will be seen lighting the highways, it will be interesting to add these tests to those already published.

The lamps in question are, I understand, exactly the same as those which are at present being largely put up in the streets of Berlin. The lamp itself appears to be a simple adaptation of the Graetzin lamp to high-pressure purposes, and differs in this respect from the Keith-Blackman lamp, which takes the fullest advantage of the pre-heating of the gas and air prior to combustion by abstracting from the products of combustion some of their escaping heat. The lamps to be installed consist of two two-mantle lamps and one three-mantle lamp. The effective size of the mantle when inflated with the flame is 3½ inches by 1¾ inches. The normal quality of the gas would be 20 to 21 candles when burned in a No. 2 "Metropolitan" argand burner, and its calorific power at the testing station 545·9 B.Th.U. net. The test was taken by a Simmance and Abady street photometer, which had been previously verified by testing a given lamp simultaneously on a 100-inch bar photometer and the portable photometer in the same room and under like conditions.

Photometrical Tests of Messrs. Falk, Stadelmann, and Co.'s New High-Pressure Inverted Lamp. Two-Mantle Light, Mantle 3½ inches Long by 1¾ inches Diameter, Slight Cone Shape.

Pressure.	Height of Lamp from Floor.	Distance of Lamp from Photometer Disc.	Angle.	Feet Candles at Photometer Disc.	Consumption per Hour.	Candle Power.	Candle Power per Cubic Foot.
Inches.	Ft. In.	Ft. In.			Cub. Ft.		
61	4 0	40 4	4°	1·75	53·0	2829	53·3
61	16 0	42 3	20°	1·70	53·0	3037	57 3
61	20 0	43 6	25°	1·65	53·0	3117	58·8
61	28 0	37 6	43°	1·87	53·0	2658	50·1

Remarks: Clear globe. The first test—viz., at an angle of 4°—is as nearly horizontal as possible without cutting off light with the shade; the last test, as near an angle of 45° as possible.

May 14, 1908.

Referring to the other tests, the normal quality of the gas would be from 20 to 21 candles when burned in a No. 2 "Metropolitan" argand burner, and its calorific power at the testing-station 526·4 B.Th.U. net. The tests were taken by a Simmance and Abady street photometer, which had been previously verified by testing a given lamp simultaneously on a 100-inch bar photometer and the portable photometer in the same room and under like conditions.

More than 5000 candles of illumination from a single lamp in size no larger than an electric arc lamp is a high degree of illumination to disperse from one centre; and, without discussing the question as to whether high-power light-centres are the best for general illuminating purposes, it does certainly appear as though we were approaching the time when workshops and warehouses

Photometrical Tests on Messrs. Falk, Stadelmann, and Co.'s New High-Pressure Inverted Lamp. Three-Mantle Light, Mantle 3½ inches Long by 1¾ inches Diameter, Slight Cone Shape.

Pressure.	Height of Lamp from Floor.	Distance of Lamp from Photometer Disc.	Angle.	Feet Candles at Photometer Disc.	Consumption per Hour.	Candle Power.	Candle Power per Cubic Foot.
Inches.	Ft. In.	Ft. In.			Cub. Ft.		
61	4 8	49 5	4°	1·7	89·4	4154	46·5
61	16 0	50 8	16°	1·8	89·4	4666	52·2
61	20 0	52 1	21°	1·9	89·4	5174	57 9
61	28 0	47 6	34°	2·1	89·4	4716	52·7

Remarks: Clear globe. The first test—viz., at an angle of 4°—is as nearly horizontal as possible without cutting off light with the shade; the last test, as near an angle of 45° as possible.

May 13, 1908.

would be as brilliantly, or even more brilliantly, lighted by artificial means than they are at present with ordinary daylight.

It will be observed that the candle efficiency per cubic foot of gas is not so great in these lamps as in the Keith-Blackman lamp. I attribute this entirely to the fact that the preheating of the gas and air supplies in these lamps is accomplished only in its passage through the pipes leading to the burners, whereas in the Keith-Blackman lamp this is a special feature of the construction of the lamp, and is brought about by causing a momentary pause or delay in the flow of the gas and air in a large chamber immediately in the full-way of the exit flue from the lamps. Another point of importance to note is that on the horizontal line the three-light lamp gives a lower efficiency per cubic foot of gas than the two-light lamp. This can only be accounted for by the fact that the third mantle is partially shadowed or shielded by the other two.

EXPERIMENTAL FORM OF GAS-HEATED BOILER.

The last issue of the "Journal of the Society of Chemical Industry" contains the text of a paper on this subject read by Mr. J. H. Lester, M.Sc., F.I.C., before the Manchester Section of the Society.

The author pointed out that the object of his experiments was to produce steam or hot water with the greatest possible economy as regards both space and fuel consumption—keeping also in view the possibility of carrying out the same principles subsequently on a larger scale. In studying the combustion of gases in confined spaces or tubes, the apparatus shown in fig. 1 was used with most interesting results.

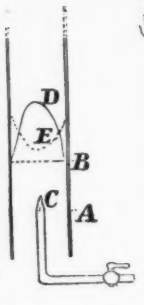


Fig. 1.

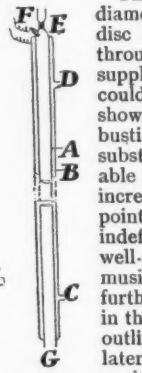


Fig. 2.

The glass tube A, about 1¼ inches diameter, was fitted with a wire-gauze disc B, and supplied with coal gas through the small jet C. If the gas supply was sufficiently reduced, a flame could be produced above the gauze, showing the convex outline D—the combustion under these conditions being substantially complete and a considerable excess of air being possible. On increasing the gas supply to a certain point, the shape of the flame became indefinite, or at any rate without any well-defined margin, and a buzzing or musical sound was produced; while further increase of gas supply resulted in the flame assuming the concave form outlined at E. In this, and in other later experiments, the production of a rapid series of explosions or musical notes appeared to be coincident with rapid alternations between the convexity and concavity of the flame, and also coincident with the conditions of "perfect gas mixture"—that is to say, with the substantial absence of both oxygen and carbon monoxide from the burnt gases. The highest musical note gave the most satisfactory results of analysis. The bearing of these results upon the structure and nature of flame cannot be now dealt with, but the musical note as an indicator of completeness of combustion may be pointed to as having a direct bearing upon the practical working of flames used for heating purposes in confined spaces.

Attempts were made to increase the rate of fuel consumption in the glass tube, and also in iron tubes, by directing the gas through small apertures at high pressure; but the mixture of gas and air was so difficult to control, and the cooling effect of the tube itself upon the flame was so great, that this procedure had to be abandoned. A very graphic form of the difficulty to be faced was exhibited in the impossibility of inflaming a jet of gas issuing from a cylinder of compressed coal gas, after the pressure had been raised above a certain and not very high point. Eventually the only practicable means of obtaining complete combustion in confined tubes was found in the premixing of the coal or producer gas with air in correct proportions; the mixture being introduced to the combustion chamber under any required pressure through a suitable non-return seal and jet—ignition being produced electrically. Fig. 2 shows the experimental boiler.

The copper tube A was of $\frac{3}{16}$ inch internal diameter about 20 inches in length, and constituted the combustion chamber of the boiler. It was surrounded by a jacket B, with water supply at C, and steam or hot water outlet at D; the construction being such that the intervening space between the combustion tube and the jacket was only about $\frac{1}{16}$ inch. This restricted space was intended to, as far as possible, prevent any downward current of water in any part of the boiler space, and as far as possible to restrict any "circulation" in the space to the upward flow of the water due to the removal of water or steam from the outlet D. The jet E, and the igniter plug D, are shown in position—the burnt gases passing into the air at G. There was found to be no difficulty in maintaining a flame of about 7 inches in length from the jet downward; and analysis of the products at G showed that it would be easy to prevent oxygen or carbon monoxide exceeding 0·5 per cent.

It will be noted that the "counter-current" principle of transferring heat from the gas to the water has been incorporated, and this was so far efficient in cooling the burnt gases that the latent heat of condensation of the water produced by the burning of the gas was given up to the boiler. The total loss of heat from the "chimney" or base of the combustion chamber never exceeded 5 per cent. when based upon the calorific value of the gas employed; and it is quite clear that lengthening of the tube would permit of its use as a calorimeter.

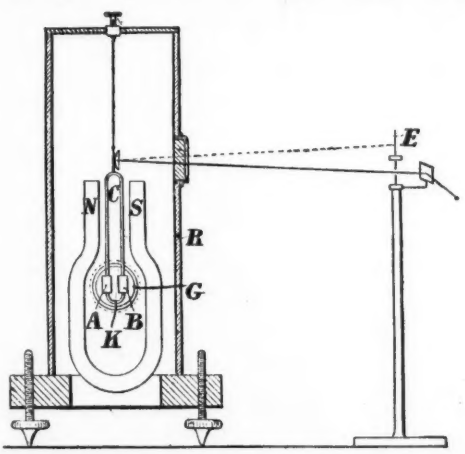
As an example of the high "duty" in steam production possible with this type of apparatus, it will be of interest to state that if it were possible to build up a series of such tubes into a block occupying one cubic yard, the amount of water evaporated would be equivalent to the average product of a Lancashire boiler, 30 feet by 8 feet, working with an economizer. This comparison is calculated upon the rate of gas consumption obtained with the experimental tube; but with somewhat longer tubes, it was evident that the gas consumption and consequent evaporation could be greatly increased.

The use of producer gas for the generation of steam for industrial purposes has not yet, so far as the writer is aware, been carried out with reasonable evaporative efficiency; but the experiments here outlined would appear to indicate that the difficulties are by no means insuperable.

A DIRECT-READING PHOTOMETER.

An abstract of the specification of a patent taken out in France last November by M. Féry appeared in a recent issue of the "Journal of the Society of Chemical Industry."

It is pointed out that a source of light emits two kinds of radiations—heat and light giving rays, and the so-called dark rays which give only heat. The method of measuring the light is as follows: The rays are first passed through a glass cell filled with some green aqueous solution. This stops the obscure rays, but



allows the light ones to pass. The light rays are then passed through a lens, to which a rocking movement is given at right angles to the direction of the beam of light, and the concentrated rays are directed alternately upon one of two thermo-junctions. The latter consist of a U-shaped bend of copper C, and an inverted U bend K, of constantan, connected by silver pieces A B, which form the thermo-junctions. The whole is suspended by a wire between the poles N S of a magnet contained in the copper casing R. The light enters through G; falls on one or other of the junctions A B; and according to its intensity sets up a greater or less current in the suspended coil, which is consequently deflected. The amount of deflection is indicated by the movement of a reflected beam of light on the scale E.

A supply of water being required for the Arc Works Athletic Ground, Chelmsford, Mr. James Tunbridge, the Parish Clerk of Broomfield, went over the ground with a divining-rod, and, as the result of boring at a spot indicated by him, an abundant supply was found at a depth of 35 feet.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

The Toddington Gas Company.

SIR,—In reference to my letter on this subject, Mr. A. F. Phillips writes me that I was mistaken in associating his name in any degree with my sale of these works, which he reminds me was to the late Mr. Charles Horsley, who was interested in a number of gas and water works in the counties lying north of London.

Mr. Phillips fears (which I think none of your readers would suppose for a moment) that a transaction over thirty years ago could in any wise be connected with any responsibility for the preposterous finance which now surrounds this little undertaking, and which he like you and myself deplores.

Palace Chambers, Westminster, S.W., May 27, 1908. H. E. JONES.

Right and Left Hand Valves.

SIR,—Mr. Charles Carpenter, in his letter in the last number of the "JOURNAL," confirms my premise that no practical person would hesitate for a moment as to which way to close a steam stop-valve. Why, then, should we not go a step farther, and remove any hesitancy there may be in the operating of gas-valves by insisting on their being constructed to close in the same direction?

Mr. Key, in his letter in the same issue, only strengthens my contention that all valves, of whatever nature, should be operated in one and the same direction, when he states that it is a settled arrangement that rack-and-pinion valves for gas-works shall open with the sun, while steam and water valves are to be left to open in the reverse direction. Surely this represents an anomalous condition of things, and is a justification of my plea for standardization; and though the precise direction of operation is, no doubt, a matter of opinion, the screwing-down action, or "closing with the sun," appears to me to be at once the simplest and most natural method for all classes of valves.

Hendon Gas-Works, Sunderland, May 28, 1908. CHAS. DRU DRURY.

The Farce of Balloting Lists.

SIR,—I have received the balloting-lists of the Institution of Gas Engineers, and am constrained to ask: Is the voting merely a form—and a farce—or is it a full and fair competitive election?

The balloting list for the election of officers and members of Council contains only the printed names of as many candidates as there are vacancies. There is no invitation, therefore, among the printed names, for a member to exercise any selection or option. All, I suppose, that he is expected to do, is to return the list as received, thus ensuring the election of the printed nominees. Theoretically and legally, of course, he may erase any name and substitute another. But who does that; and if anyone did so, what chance, under this system, would the substituted candidate have of election? Practically no chance at all. Surely, for at least members of Council, there ought to be more candidates than vacancies; so that the polling might have some resemblance of a real elective test. Even the Institution of Civil Engineers' list always contains some extra names to be erased; so that what may be termed a negative option can be exercised by the voting member.

As to the balloting list of new members, it is of interest to note that no less than 19 out of the 33 candidates hail from North of the Tweed. This is no doubt a tribute to the worthy President. But what puzzles me is why the "managers" of small gas-works of unheard-of and unpronounceable Scotch villages should appear under "members," while the names of those at large and important works and managers at well-known towns should be down for election as only "associate members." Is not the whole election farcical? So it seems to me; and, therefore, my balloting lists will be relegated to the only suitable place for them—the waste-paper basket.

May 30, 1908. A WOULD-BE SERIOUS VOTER.

Sulphate Saturators.

SIR,—In reply to Mr. Pettigrew's letter in your last issue, I have not misapplied his remarks. Their meaning is perfectly clear.

Undoubtedly, Mr. Pettigrew's arrangement No. 1, with the internal cracker-pipe placed in the recess, is no better and no worse than the ordinary cracker-pipe; and No. 2, with hollow belt and holes drilled through the wall of the saturator as an alternative method, is no better as regards distribution of the gases than the first plan. Mr. Pettigrew now states that the perforations are in practice so strengthened that they are not dependent upon the thickness of the walls of the saturator. Was it in his mind, at the time of filing his complete specification, that this method was a distinct improvement on the ordinary cracker-pipe? If so, it was surely an omission on his part not to add a claim in his specification to cover this improvement. I cannot think that one with over twenty years' experience is likely to overlook so important an advantage.

There is not a word in Mr. Pettigrew's specification referring to this; and his only claim is that by his method of placing the distributing arrangements the sulphate is free to fall to the point of discharge. This I referred to in my last letter (see *ante*, p. 444); and I cited Mr. Duggan's patent, in which the saturator affords the same facility with regard to the passing of the salt to the outlet.

Mr. Pettigrew says: "In my specification I show quite clearly the wall of the saturator perforated as described above; and it is here where Messrs. Williams and Fenner infringe my patent." Surely he is going to allow us to perforate the walls of the saturator somewhere; otherwise I do not see how anyone is going to make sulphate in a saturator other than that supplied by Mr. Pettigrew without infringing his patent. If we were to make two perforations only in the wall of the

saturator for the admission of the gases by means of two pipes, would that be an infringement? Clearly not; and therefore to perforate in twenty places cannot be. So long as we do not place our cracker-pipe in a recess in the side of the saturator, or make use of a hollow belt, we cannot possibly infringe his patent.

Gas-Works, Poplar, E., May 29, 1908. P. E. WILLIAMS.

"Coalexld."

SIR,—I suppose this title is a paraphrase of, or a pun upon, the words "coal excelled."

I cannot understand how an admixture of chemicals is going to do all that is claimed, or even a portion of it. Regarding the question from a purely chemical standpoint, "chlorate of potash," "saltpetre," and "permanganate of potash" are used in very limited quantities. All these ingredients would simply afford oxygen, which would diminish the available hydrogen in the coal, increase the proportion of water produced, and decrease the value of the coke by the amount of mineral constituents added. On exposure to a high temperature, all the materials named would give off oxygen and leave in the case of chlorate of potash a residue of chloride, in the case of saltpetre a residue of potassium carbonate, and in the case of permanganate of potash a possible residue of a manganese oxide and potassium carbonate.

Of course, when well-known people are taking up the claim seriously, we must wait for the results of practical trials. In the meantime, I must confess to being very sceptical.

May 28, 1908. H. LEICESTER GREVILLE, F.I.C., F.C.S.

LEGAL INTELLIGENCE.

RESPONSIBILITY FOR THE REINSTATEMENT OF ROADS

The action of *Stratford v. Metropolitan Water Board*, which was tried before Mr. Justice Bigham and a Special Jury last Thursday, was brought to recover damages in respect of personal injuries sustained through the alleged negligence of the defendants in improperly filling in a trench after laying a new main in Hoe Street, Walthamstow. A trench 3 ft. 6 in. deep and 1 ft. 6 in. wide having been filled in, the plaintiff on Dec. 15, 1906, when driving a pair-horse van, was thrown from the dickey and seriously injured through, as he alleged, the wheel sinking in the trench. Mr. Eldon Bankes, K.C. (with him Mr. A. B. Shaw), for the defendants, said that in 1906 the Walthamstow District Council were engaged in electrifying their tramways, and below part of the tramway ran a 6-inch water-main belonging to the defendants. Under the Light Railway Act, provision was made, in case the tramway authorities required any of the gas or water mains to be moved, for their removal; the companies owning the mains, if they preferred to carry out the work, being allowed to do it. When notice was given by the District Council that they required the main to be moved, the defendants said they preferred to do the work themselves. They at once proceeded to lay a new main at the side of the road, and dug a trench at right angles to connect it with the old main, which was not removed. The obligation to maintain the road did not rest upon the Water Board, but upon the District Council, who paid the Board for doing the work. Had this not been properly carried out, the Council could have called on the Board to complete it before opening the road. The obligation was clearly upon the Council to look after the road; and it had been decided in the case of *Hyams v. Webster* that after the work was done the obligation was upon the Council to see that the trench was in a proper condition. The work was finished on the 30th of November, and the accident did not happen till the 17th of December, and was caused, according to his evidence, not from any defect in the road, but through the horse slipping on the tram lines. Evidence having been given that the work was properly done by Messrs. Docwra, the Contractors for the Board, and duly passed by the Council, Mr. Mallinson (for the plaintiff) contended that the obligation upon the defendants was to restore the road to a safe condition. His Lordship left the following questions to the Jury: (1) Had the defendants filled in the trench in a proper and workmanlike manner on Nov. 30, when they left the work? (2) If not, did the accident result from their neglect to do so? The Jury found in favour of the plaintiff, and assessed the damages at £150. Judgment was entered accordingly.

MANUFACTURE OF THORIUM NITRATE.

The Action for Wrongful Dismissal.

On Monday last week, Mr. Justice Lawrance gave judgment in the action brought by Dr. Franz Fredericks against Messrs. Hopkin and Williams, which was heard by him and a Special Jury some weeks ago (see *ante*. p. 172), and resulted in the Jury giving him a verdict for £500 damages for wrongful dismissal from his post as their Chemist to supervise the manufacture of thorium nitrate.

Mr. J. A. SIMON, K.C., M.P., and Mr. R. B. MURPHY appeared for the plaintiff; Mr. E. POLLOCK, K.C., and Mr. COLEFAX represented the defendants.

Justice LAWRANCE said that after the Jury had given their verdict, the plaintiff's Counsel argued that, in addition to the £500 damages, he also was entitled to an account of royalties due, and an injunction, in the terms of the agreement, restraining the defendants from manufacturing thorium nitrate except under his supervision. The only reason he deferred judgment was that, in addition to other terrors held over his head, his summing up was quoted, and he wanted to refer to it to see how he had directed the Jury and whether he had suggested that if they gave the plaintiff a lump sum for damages it would cover the whole claim. He had referred to his summing up, and found that he made no such suggestion, and that what he said rather operated the other way. He therefore thought he must give judgment for the plaintiff for £500 damages, for an account of royalties if any were due, and for an injunction, though he was afraid it would lead to further litigation. It was clearly a matter that the parties would be wise to settle upon any reasonable terms.

Mr. POLLOCK said his real objection to the injunction was that it would prevent the defendants from continuing the manufacture of thorium nitrate, though they were to pay plaintiff £500 damages.

Justice LAWRANCE said he recognized the difficulty to the defendants that an injunction in the terms of the agreement would prevent them from making thorium nitrate, except under the plaintiff's supervision; and this was why he suggested some arrangement.

Mr. POLLOCK said it would put an end to their manufacture. Their case was that they were not now making thorium nitrate according to the plaintiff's process, and that having to pay plaintiff £500 damages put an end to the whole agreement. The injunction asked for was in much too wide terms, and he said that the only injunction which could be granted was one restraining the defendants from making thorium nitrate by plaintiff's process unless they accounted to him for royalties.

Mr. MURPHY submitted that the plaintiff was entitled to an injunction in the full terms of the agreement.

Justice LAWRANCE said he would open wide the flood-gates of litigation for both parties. He would give the plaintiff an account and an injunction in the terms of the agreement as asked for. At the same time, he repeated that the parties would be wise to settle the matter.

Mr. POLLOCK said he would convey this intimation to his clients. He asked for a stay of execution generally, as the plaintiff was a German not resident in this country. Defendants would bring the £500 into Court.

His LORDSHIP entered judgment as above, and granted a stay of execution on the usual terms.

GAS AND WATER SUPPLY AT THE ENGINEERING EXHIBITION.

At the Shoreditch County Court last Friday, before his Honour Judge Smyly, K.C., Messrs. Tilley Bros., of 53, Kingsland Road, gas, hot water, and electrical engineers, sued Messrs. Smith and Bridges, of 119, Finsbury Pavement, to recover £11 13s. 3d., the balance of an account for laying on a water and gas supply to various firms at the Engineering and Machinery Exhibition held at Olympia in 1906. Mr. Rule appeared for the plaintiffs; and Mr. Jones represented the defendants. Mr. Rule said that Messrs. Smith and Bridges were the organizers of the exhibition, and the plaintiffs were contractors for laying on the gas and water supply to the stands. Everything had apparently gone on smoothly with the exception of the gas supply for Messrs. Keith and Blackman, Messrs. Siemens, and Messrs. Holden and Brook. In the first two cases, the liability was disputed; it being contended that the holders of the stalls ordered the work, and even if they did not, the defendants said they could not be held liable. In the last case, the liability was not disputed, but it became a question as to whether the job was worth £4 or £6; it being suggested that the amount of work originally contracted for was not done, as it was not found necessary. Mr. Tilley was called in support of Counsel's statement. Referring to the work that was being sued for, he said that on whatever orders were given by the stallholders he allowed the defendants a commission of 1 per cent.; but he always had a written order. The agreed amount for the work to be done for Messrs. Holden and Brook was £6; but he could not say whether what was contracted for had been carried out. The plaintiffs' foreman was called, and said he received the orders for the work from Mr. Smith, who in the Keith and Blackman case (an £8 job) said he could lay on the gas if they wanted him to do so. In the Holden and Brook job, the amount of work done was perhaps laying 5 feet of gas-pipe short of what was first agreed upon, and even that was doubtful. For the defence, Mr. G. D. Smith, one of the defendants, said he never gave an order for the work carried out for Messrs. Keith and Blackman. The circumstances were that this firm had a very large fountain which they offered to lend the defendants if they cared to connect up with the fountain the gas supply with the ceiling and the water supply. The plaintiffs were given the work to do; but when the bill for £33 came in he saw that there was a charge of £8 for connecting the gas and water with the stand. He immediately repudiated the amount; pointing out that he never ordered the connecting up of the gas. He knew the gas-service was being carried out, but did not know whether or not the plaintiffs had the order for it direct. As soon as they had the name of the exhibitor, it was handed over to the plaintiffs, and they tried to obtain the carrying out of the work; and if they succeeded, they allowed the defendants 1 per cent. commission. With reference to the account for £6 for Messrs. Holden and Brook, they asked for a proportionate reduction in view of the decreased amount of work done. The original idea was to lay the gas-service on two sides of a triangle; but that was considerably reduced by making it an almost straight service. He never ordered the connection from the fountain to the stand, but only from the ceiling to the fountain. His Honour decided to allow £1; and judgment was entered for the plaintiffs for £10 13s. 3d. and costs.

Bankruptcy of a Gas Inspector.—At the London Bankruptcy Court last Friday, a meeting took place of the creditors of Harry Chaston, a gas inspector, of 57A, New King's Road, Fulham. The liabilities are £469, and the assets £58 10s. The debtor attributed his failure to his household and personal expenses having exceeded his income; and he said he had known of his insolvency for four or five years. He was in the service of the Gaslight and Coke Company; but they compelled him to resign when they heard of a County Court judgment having been obtained against him, and he had since been out of employment. His assets consisted of money he had paid into the guarantee fund of the Company. The Official Receiver will wind up the estate.

THE

IDEAL KITCHEN

IS FITTED WITH

THE PATENTED "ADVANCE" COOKER

AND THE

Wilson Patent CIRCULATOR.

No need to use the Kitchen Fire.

The 'ADVANCE' COOKER

HAS

16 Distinct and Attractive Improvements

For which we are indebted to

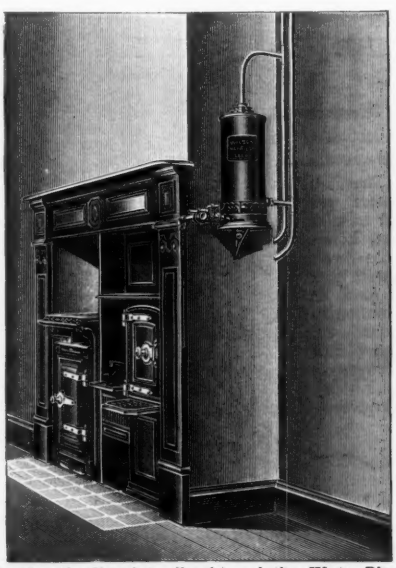
MISS HELEN EDDEN

(Chief Demonstrator, Gaslight and Coke Company)

for valuable co-operation and advice.

SEE SPECIAL NOTICE IN

"GAS JOURNAL" for May 26, page 494.



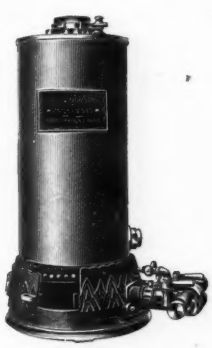
Showing the Circulator fixed to existing Water Pipes.

THE

WILSON "CIRCULATOR"

Easy and Cheap to Instal.

Economical in Use.

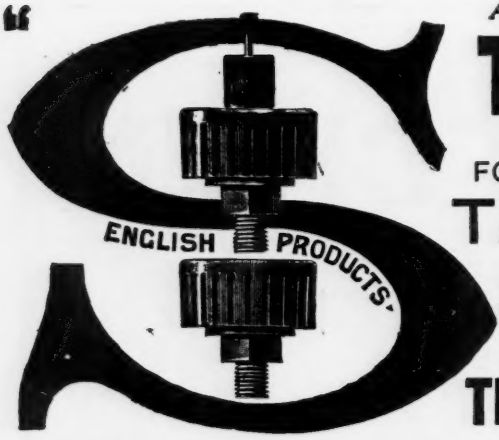


WILSONS & MATHIESONS, LTD.,
Carlton Works,
Armley, LEEDS.

Write us for Further Particulars.

London Show-Rooms:
76, Queen Street,
Cheapside, E.C.

"



A BOON TO MASTER, MAN, and MACHINE.

STAUFFER'S REG. TRADE MARK.

CENTIGRADE FOR HOT PLACES **LUBRICANT"**

STANDARD MACHINE GREASE.

SAVING UP TO 90 PER CENT. OVER LIQUID OIL.

Patent "Unbreakable" & "Telltale" Stauffer Lubricators.

SOLE MAKERS—

TRIER BROS., 1, GT. GEORGE ST., WESTMINSTER, LONDON.

CUMBERLAND WORKS, NEW CHURCH RD., CAMBERWELL.

CARBURETTED WATER-GAS PLANTS.

THE ECONOMICAL GAS APPARATUS CONSTRUCTION CO., LTD., are NOT ALLIED with any AMERICAN or other GAS TRUST and have INDEPENDENTLY CONSTRUCTED in different parts of the World **113** SETS of the MERRIFIELD-WESTCOTT-PEARSON PLANT having a TOTAL CAPACITY of **66,045,000** CUBIC FEET per day. This Type embodies the LATEST EVOLUTION IN C.W.G. and is the outcome of the Patentees' early experience with the Double Superheater Plant.

19, ABINGDON STREET, WESTMINSTER, S.W., AND 269, FRONT STREET EAST, TORONTO.

Telephone: 39 VICTORIA. **Telegrams and Cables: "CARBURETED LONDON," "CARBURETED TORONTO."**

SAWER & PURVES,

THE PIONEERS OF THE SLOT METER.

FIRST IN 1889.

THE INTRODUCTION OF THE SLOT METER.

WRITING to supplement the information given in our "Questions and Answers" column last week with regard to the introduction of the slot meter, a correspondent says that the first patentee was Mr. W. Brownhill, but his meter was never in practical use. The first Gas Company to supply gas in quantity through slot meters was the Liverpool United Gas Company. They supplied gas in bulk to the Corporation for the artisans' dwellings in Casino Street, Liverpool. The Corporation fixed 50 penny-in-the-slot meters in these dwellings. The meters were Thorp and Marsh's patent, and they were manufactured by Messrs. Sawer and Purves. The meters were fixed for six months on approval, at the end of which time the Corporation had to decide whether they were a success or failure. Mr. Marsh entered into a guarantee that the meters should be satisfactory, and he undertook liability for any accident that might occur. Our correspondent adds that he has no hesitation in saying that Sir George Livesey was the first man controlling a gas undertaking to strenuously advocate the use of the slot meter.

GAS v. ELECTRICITY

(From the GAS WORLD.)

FOREMOST 1908.

MILES PLATTING, RADFORD ROAD,

Scotch Agent: JNO. D. GIBSON, 93] Hope Street,

MANCHESTER, GLASGOW, NOTTINGHAM.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills brought from the Commons, read the first time, and referred to the Examiners: Camborne Water Bill, Garw and Ogmore Gas Bill, Southwell District Gas Bill, Wolverhampton Corporation Bill.

Bills read a second time and committed: Camborne Water Bill, Margate Corporation Bill, Southwell District Gas Bill.

Bills reported: Blaydon and Ryton Water (Transfer) Bill, Conway and Colwyn Bay Joint Water Board Bill, Draycott Gas Bill, Dartford Gas Bill, Leicester Corporation Bill, Wath-upon-Dearne Urban District Council Gas Bill [now Wath and Bolton Gas Board Bill].

Bills read the third time and passed: Conway and Colwyn Bay Joint Water Board Bill, Dartford Gas Bill, Rochdale Corporation Bill.

Petitions against the Gas and Water Orders Confirmation Bill have been presented by the Urban District Councils of Stourbridge, Lye, and Wollescote and Amblecote, and the Rural District Councils of Bromsgrove and Kingswinford, in respect of the Stourbridge Water Order; and by the Sevenoaks Urban District Council in respect of the Sevenoaks Water Order.

HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Lords Bills read a second time and committed: Bognor Gaslight and Coke Company Bill, Swansea Valley Gas Bill.

Bills reported: Briton Ferry Urban District Council Bill [Lords], Criccieth Water and Improvement Bill, Llanelly Gas Bill [Lords], Padiham Urban District Council Bill, South-West Suburban Water Bill, Swansea Valley Gas Bill [Lords].

Bills read the third time and passed: Camborne Water Bill, Garw and Ogmore Gas Bill, Skegness Urban District Council Bill [Lords], Wolverhampton Corporation Bill.

Petitions have been presented against the Port of London Bill by the Commercial, Gaslight and Coke, South Metropolitan, South Suburban, and Wandsworth and Putney Gas Companies, and by the Metropolitan Water Board. The Committee on the Bill will commence their sittings to-day.

DRAYCOTT GAS BILL.

House of Lords Committee.—Monday, May 25.

Before Lord KINTORE, *Chairman*, *Lord* CLIFTON, *Duke of* WELLINGTON, *Lord* WESTMEATH, *and Lord* ELLENBOROUGH.)

As briefly recorded in the "JOURNAL" last week (p. 511), the Committee concluded the hearing to-day of the Bill promoted by the Draycott Gas Company.

Mr. HONORATUS LLOYD, K.C., Mr. G. J. TALBOT, K.C., and Mr. R. S. CLEASE appeared for the promoters; while the only petitioners against the Bill—the Long Eaton Gas Company—were represented by Mr. BALFOUR BROWNE, K.C., the Hon. J. D. FITZGERALD, K.C., and Mr. C. C. HUTCHINSON.

The case for the promoters having been finished at the previous sitting of the Committee, evidence was now given in support of the petition.

Mr. *Thomas Merry*, the Chairman of the Breaston Parish Council, said that at a meeting of the Council it was decided that it was too late to oppose the Bill; but the feeling of the Council was against the measure. He agreed that the Draycott Company had offered to supply them with gas time after time; and, had they wanted it, they could have had it. But they were attracted by the price of 2s. offered by the Long Eaton Company. If the price were to rise, they might go back to the use of oil.

Mr. *Samuel Hind*, a lace maker, of Breaston, said the reason he took the Long Eaton Company's gas was because he had not been satisfied with the supply provided by the Draycott Company. He admitted that he had not complained directly to the Draycott Company. They took the offer of a supply at 2s. per 1000 cubic feet; and they believed the price would continue.

Mr. *Bryan*, a coal merchant, of Draycott, admitted that he had had no cause to complain of the supply of gas as given by the Draycott Company.

Mr. *E. H. Stevenson* said that, looking at the existing state of affairs in the contested area from the point of view of a gas engineer, he saw no reason why the competition should be terminated. The figure at which the Long Eaton Company were supplying was not below the cost of the gas; as a matter of fact, 2s. per 1000 cubic feet yielded them a profit. It was a price which they intended to work to. For some years past they had been wiping off dead-capital to the extent of 6d. or 7d. per 1000 feet; and the accounts for 1907 showed that they were now approaching the time when the Long Eaton Company would be able to charge 2s. per 1000 feet over the whole of their district. This was the policy he had advised the Directors to work to. Quite apart from the circumstances of competition, it was the policy which would have followed within a short period; and, irrespective of any result of the present Bill, the price of gas to be charged in Draycott by the Long Eaton Company would be 2s. under the circumstances. The average price now in Long Eaton by prepayment meters was 2s. 1·8d., which was 1·8d. above the price charged in Draycott. The charge for power purposes was 1s. 6d. For the last five or six years, the price had been the same everywhere until the present competition arose. Before anything had been said about the present Bill, the mains at Breaston had been laid and the mains for Draycott had been delivered at the Railway Station. He had not calculated what the cost had been of laying the mains; but the probable loss to the Long Eaton Company, if these pipes were taken up under the terms of the Bill, would be £3230. He had had regard to the fact that the supply for the parish of Risley would have to be given through the area in question, and then the mains would run in a northerly direction. If these pipes had to be taken up, the effect would be that the whole of the supplies in one particular district would be cut off, and the cost of giving a supply to Risley would be increased. So that really the cost of taking up the pipes would not be the extent of their loss. In the contested area they had got, in all, 58 customers. Only seven of these had been taken away from the rival Company; 51 being new customers, who had been attracted to the Long Eaton Company by the considerations they had offered. This supply in itself was remunerative. They were not paying all the charges upon capital; and they were not, and had not been at any time, paying maximum dividends. They had chosen to put the money into the business. It was not their policy or intention to smash the Draycott Company; and, as a matter of fact, they could not do so, because the Draycott Company had got the whole of the mills. He had heard that something like 70 to 75 per cent. of the gas supplied was to these large mills.

Mr. HONORATUS LLOYD: Did you ever know a case where a gas undertaking charged less in the outlying districts than at home?

Witness: No; I do not know that I have.

Asked if it was a reasonable thing to do, witness said that in ordinary circumstances it would not be; but in cases of competition it was necessary to reduce the price. He went on to say that the object of the limitation was, from the Company's point of view, that in the event of coal rising very much in price, or anything of that sort, they would not be penalized for more than three years. The charge of 2s. 8½d. per 1000 cubic feet in Long Eaton for small consumers would be too high as soon as they had paid off all their dead-capital, which was practically done. Up till recently it had been a reasonable price under the circumstances. But it was the competition which kept the price at 2s.; and the Company intended to work to this figure. The Long Eaton Company had purchased an adjoining undertaking of a substantial area. With regard to the pipes which had been laid into the district, the contract for the work had been entered into before the notice for the Bill. If these pipes were taken up, 4s. 6d. a yard would cover the cost. Of the 58 consumers that the Long Eaton Company had obtained in the contested area, 40 were slot-meter customers, and now nearly everybody was supplied; but the neighbourhood was rapidly growing. The number of mills was increasing, as was also the population. He admitted that as the population stood at present they would be unable to get any further business unless they took it away from the Draycott Company. The charges made by the Draycott Company had been very reasonable; but fear of competition had affected the prices.

Mr. HUTCHINSON: When the dead-capital is worked off, the 2s. flat-rate will come into operation over the whole of the area?

Witness: Yes.

In conclusion, witness said that in the price of 2s., the discounts were rather less.

Mr. HONORATUS LLOYD, replying on the whole case, said that this was an important matter in the gas world, because a unique state of affairs had arisen; and the only justification for this was that so long as it lasted it was good for the public. They had got an artificial price; and the customer was getting an article for which he was not paying the commercial value. He was getting it in order that each of the Companies should cut the other's throat. This was common ground between them. Not for forty years had Parliament granted concurrent powers; and it had been recognized that competition was not in the interests of anybody—not even of the public. The Draycott Company had carried on their undertaking to the satisfaction of the whole district. Everybody had been perfectly satisfied with the supply; and the prices, considering the size of the undertaking, compared favourably with any undertaking in the country. Then, after 27 years of inaction, when the Draycott Company had made the business and had offered a supply to everybody, the Long Eaton Company made an incursion into their area and employed methods which were not the fairest. The witnesses for the petition had said that they never thought of getting rid of the Draycott Company, or of buying it at a reduced price, as had been suggested in the other House. They never thought of wounding them or of reducing them to their knees; but they had gone to the Draycott Company's customers and offered them a supply at 2s. per 1000 cubic feet, which the Chairman of the Company had admitted was an artificial price which he did not want to continue. But it was perfectly obvious from the evidence (with the exception of Mr. Stevenson's) that they hoped that the two years limit would be sufficient to see the end of the Draycott Company. Mr. Stevenson had made the suggestion that they had been wiping off capital out of income; and if this was so, there would be something said next time they came before Parliament. He further remarked that in the near future they looked forward to having a price of something like 2s. over the whole of the district. But the fact was they had brought forward an artificial price; and the number of houses being so small, they knew that, unless they came down below the cost of oil, they could not get any customers at all. How satisfactory the Draycott Company's supply had been was proved by the fact that, with all their underhand methods, the Long Eaton Company had only been able to get seven customers. They had put the Draycott Company to two hard fights in the Houses of Parliament, which meant a very serious matter to such a small concern. And now they said: "If we are to go out, make this little Company pay us the whole cost of taking up the mains," which everybody agreed had been laid most unnecessarily.

After a private consultation, the Committee decided that the preamble of the Bill was proved; but failing agreement for the disposal of the Long Eaton Company's mains *in situ* from the point of junction of the Risley main at Breaston to the Railway crossing, and in the event of their having to be removed, the Committee allowed compensation to the Long Eaton Company up to the amount of the expense only—the amount to be settled by arbitration.

The clauses were then adjusted; the old renewal fund clause going through without comment.

FINCHLEY URBAN DISTRICT COUNCIL BILL.

Extension of Electricity Supply Area—Objectionable Clauses Omitted.

The Committee of the House of Lords presided over by the Earl of KINTORE had under consideration on the 25th ult. the Finchley Urban District Council Bill, which contains a part dealing with the extension of the electricity supply area.

Mr. RAM, K.C., and Mr. VESEY KNOX, K.C., appeared for the promoters; Mr. C. C. HUTCHINSON represented the Hertfordshire County Council, and Sir RALPH LITTLER, C.B., K.C., the Southgate and District Gas Company.

Mr. RAM, in opening, said the Bill was of an omnibus character, and came before the Police and Sanitary Committee of the other House, who dealt with a portion of the measure. The one point that was opposed in the present instance was in clause 4, which dealt with the extension of the area of supply of electricity. The proposed extended area was something like 140 feet in one place—the extension was most minute. The Urban District Council were the authority supplying electrical energy and light within their own district; but it was considered convenient to obtain powers to supply some houses just over the border. There were no less than four Gas Companies serving this area of Finchley. In the House of Commons two of the Companies opposed; in the present case only one of them was in opposition. In the other House, they were opposed by the Barnet District Gas and Water Company, who said: "You will be giving electricity to people who cannot get it now, and therefore they will not buy gas from us; you are invading our territory." The House of Commons Committee considered that their case was so infinitesimal that they refused to give them any kind of protection at all. The petitioners now were the Southgate and District Gas Company, who opposed with regard to a small portion of Woodhouse Lane. Their interest was about one-fifth of that of the other Gas Companies who did not oppose. The Company stated in their petition that the Council had up to March 31, 1907, expended £76,561 upon their electric light undertaking; and that the revenue account at the same date showed a loss of £712. Paragraph 7 of the petition was as follows: "The total assessable value of the premises within the Council's district is £218,818, and the total indebtedness of the Council is £343,139. In this indebtedness is included £75,660 borrowed within the last five years, on the security of the Council's rates, for the purposes of the Council's electricity undertaking; and, the Council having already obtained sanction for loans amounting to £86,960, they are now seeking to borrow, for the purposes of the same undertaking, a further sum of £22,000, which, added to the £86,960, will make a total of £108,960 raised, or to be raised, upon the security of the district rates for the said undertaking, or nearly half the district's total assessable value." It was only quite recently that they had started these works; and there was in every electricity undertaking a loss for the first few years. With them, this loss had been getting less and less; and in the present year there was actually no loss, but a gain. The Company also complained that the Council would be empowered for the first time to compete with them; and they objected to the Council continuing to trade in their own district as purveyors of electrical energy under conditions which allowed all loss occasioned by such trading to be borne by the ratepayers, including the Company. The Company said that there would be serious interference with their mains, pipes, and other property; and he (Mr. Ram) asked if the draftsmen really knew that they were dealing with this place about a quarter-of-a-mile long. They asked that the Council should be subjected to such parliamentary provisions as would effectually forbid the imposition of any burden upon the rates in respect of the electrical undertaking. In another paragraph of the petition, the Company were hinting at what was known as the "Northumberland Clause." He should be the very last to deny that in many cases it was a most wise provision. Shortly stated, it was this: If, when an electrical undertaking came into the area of a gas company where the electrical undertaking was in the hands of an authority that could rate, then it was held that there might be an injustice done to the gas company if the competition was large, by reason of the fact that on the gas company might be laid the burden of having to carry on their undertaking in competition with the authority who had the rates behind them. The clause effected this—where the clause was put in, the authority, in generating and selling electricity, must keep the price at such a height as to prevent them having to go on the rates for a rate-in-aid. This had no application whatever here; for they were seeking merely to supply a few houses abutting on one road; and the effect would be not only to prevent these houses having any light at all, but to raise the rate adversely to the interests of every consumer of electricity in the whole district.

Mr. *E. Hutchinson Lister* formally proved the preamble of the Bill; and it was decided not to call any further evidence.

Sir RALPH LITTLER remarked that this was a very small matter so far as the actual pecuniary substance of it was concerned; but his experience was that, once they let a matter which was a question of principle go by, they were told afterwards that they were too late to discuss the principle. As regarded the general question, it was of the greatest importance. The Southgate Company were supplying Friern Barnet, Finchley itself, the parish of Southgate, and a portion of Enfield; and this electrical question arose more and more almost every year. If at the time the Order was originally applied for there had been any opportunity of raising the "Northumberland Clause," they would have done so then; but the clause was brought in after the time when they got their Provisional Order. They were asking for this because they were strongly of opinion that it would be a very great hardship upon them (inasmuch as in every case since 1904 it had been granted) if it should be refused now simply because the first bite at their territory happened to be a very small one. Really the whole of the argument of his learned friend was that it was a very small bite. He was asking the Committee to uphold a series of decisions which applied to a very large area, and one on which certainly gas companies generally placed great reliance as being the only safeguard that they had. The Company had a district to the east of the Council; and if once the latter established this principle, they would have the opportunity of interfering with the Company's district.

Mr. RAM told the Committee that the Board of Trade in their report had taken no exception to what they proposed—they had no desire to say anything one way or the other.

After consultation in private,

The CHAIRMAN said: We pass your Bill, Mr. Ram; but we put the "Northumberland Clause" upon you.

Mr. RAM: If your Lordship pleases. We will consider what course we will pursue. Proceeding, Counsel asked if the decision extended to the Great North Road—another portion which they proposed to supply. He did not know whether the decision would apply to the whole of the district or only to Woodhouse Lane.

Sir RALPH LITTLER: Surely, my Lord, the principle is the principle; and I earnestly ask you to say that it shall apply to the whole.

The CHAIRMAN: Where you ask for it, we give it.

Mr. RAM: For the whole?

The CHAIRMAN: If Sir Ralph asks for the whole, he will have it for the whole.

Mr. RAM: Then I am afraid the people will not get any electric light. That, I take it, only applies to clause 4.

Sir RALPH LITTLER: No; the whole of the electrical part of the Bill must go. That is the principle.

Mr. RAM: I understand your Lordships' decision now to apply to both these areas, as my learned friend asks for it.

The CHAIRMAN: Yes.

Mr. RAM: Then I ask to be allowed to withdraw clause 4, which is the only clause which my learned friend appears against, and the only one that affects him, and the rest of the Bill will stand.

Sir RALPH LITTLER said that if they withdrew anything, they must withdraw the whole of the electrical powers. They had come and asked for the whole; and the Committee had decided against them. They were now asking the Committee to allow them to get out of the position in which they had placed themselves by simply withdrawing a portion. He certainly submitted that, according to precedent, they ought to have no electrical powers at all unless they consented to insert the "Northumberland Clause." If they chose to withdraw all the electrical powers, he could not help it; but unless they did, they ought to put themselves into line with general legislation.

The CHAIRMAN: I must say that is my view.

Mr. RAM: Before you decide against me, may I just say that the "Northumberland Clause" is intended to apply where nobody comes for an extension. The clauses that you have struck out now are the only ones that relate directly or indirectly to extension. I ask your Lordship to allow all to stand except those you have struck out.

Clauses 4, 5, 7, and 10 were struck out; and after the clauses had been adjusted, the Bill was ordered to be reported, as amended, to the House.

DAYLIGHT SAVING BILL.

Evidence Given by Sir George Livesey.

Our readers are aware that the Daylight Saving Bill, introduced by Mr. R. Pearce, is now being considered by a Select Committee of the House of Commons presided over by Sir Edward Sassoon. The Bill, it will be remembered, provides that on each of the four Sundays in April all clocks shall be advanced 20 minutes, and on each of the four Sundays in September they shall be put back for a similar period. At the sitting of the Committee last Thursday, evidence was given by Sir George Livesey as to the effect of the measure on artificial lighting.

In answer to questions put by the Chairman, Sir *George Livesey* said: I have not read the Bill; but I understand the general principle. I quite appreciate the advantages of early rising; but I do not approve of the methods by which the Bill seeks to procure it. I disapprove altogether of altering the clocks. Early rising, as I have said, I am entirely in favour of, and should be very glad to see it more general. I have seen it stated that the Bill would effect an enormous saving in the use of artificial light. I quite see the advantage of an hour and twenty minutes extra time in the fresh air of the morning; but in comparison with this advantage the loss to those who have to supply artificial light need not be considered. It would not be serious. I have read Mr. Willett's book, and I was greatly interested in his tabulated statement. He seems to have put the cost of artificial light at 0·1d. per hour for each individual inhabitant of the country. I cannot follow his figures at all; and I thought it better to take the case of the South Metropolitan Gas Company. We supply about 8 per cent. of all the gas used in the United Kingdom; and I have taken the consumption of gas hour by hour between 10 p.m. and 11 p.m., 11 p.m. to midnight, midnight to 1 a.m., and 1 to 2 a.m., for the four summer months, May to August. I do not think the Bill would make any practical alteration in the quantity of gas consumed between 9 p.m. and 10 p.m. People would not go to bed before ten o'clock; and though some of the small shops which now keep open until that hour would probably close at nine o'clock if the alteration were carried out, still I do not think it would make an appreciable difference. If the day's work commenced an hour and twenty minutes sooner than it does now, people might go to bed an hour earlier, but that is doubtful. Working men go to bed, as a rule, about ten or half-past ten o'clock. They would not go to bed at nine o'clock in the summer months. I am assuming that from ten o'clock there would be an advance of an hour. The consumption of gas, if the Bill passes, would be from ten to eleven o'clock the same as it is now from eleven to twelve; from eleven to twelve it would be the same as it is now from twelve to one; and from twelve to one as it is now from one to two. I think this would carry it far enough. From ten to one, the consumption would be the same as it is at present from eleven to two o'clock. In our Company, in the four summer months, we sent out 518 million cubic feet of gas in the three hours between ten and one. (See details at foot.)

The CHAIRMAN: The question of the saving of artificial illumination is only subsidiary. Can you tell us how the Bill would affect your

own workpeople, and what effect it would have upon the general economy of the Company?

Mr. HOLT (a member of the Committee): We have had half the figures and should like to have the other half.

Witness: Instead of a consumption of 518 million cubic feet, there would only be a consumption of 297 millions—a loss of 221 millions. At our price of 2s. 3d. per 1000 cubic feet, this would work out at a loss to our Company of about £25,000 of gas-rental, but only about £7000 of profit—not worth notice. On the assumption that we supply 8 per cent. of the total consumption, the saving, at, say, an average price for the whole kingdom of 2s. 9d. per 1000 feet, would be about £380,000. Mr. Willett puts it at £3,820,250; but, of course, that includes all forms of artificial light. I should say gas certainly constitutes much more than half of the artificial light. The money question is practically of no importance.

The CHAIRMAN: I understood you to say you approved of the object at which the Bill aims, but you do not approve of the methods?

Witness: The object, of course, is to begin work 80 minutes earlier and end 80 minutes earlier. Yesterday I called together two bodies of our workmen, and asked their opinion. I said: "Talk the matter over among yourselves, and I will take a vote." Out of 200, 13 held up their hands in favour of the alteration; all the rest were against it. I went to another body of men—quite 400—and put the same question to them. There was not one in favour—every hand was held up against it. They said: "If we come late at six o'clock we lose an hour. There would be a great deal more loss of time if we had to commence at twenty minutes to five instead of six." I then went to the office, where there were about 200 clerks and inspectors, and put the question to them. I asked them to talk the matter over among themselves. Of the clerks, six held up their hands in favour of the alteration; all the rest were against it. Some of the men said to me: "What we should like better would be to begin work later rather than earlier." An employer with a large manufacturing business in the Borough told me yesterday that a few years ago he asked his men whether they desired any alteration of their hours; and 90 per cent. were in favour of beginning at seven and ending at six o'clock, instead of beginning at six and ending at five o'clock.

The CHAIRMAN: All the Bill seeks to do is to give people an opportunity of starting work earlier and leaving off earlier. That is all it does; and with your enormous experience, you will, I suppose, agree that no change of this nature could possibly be effected unless it had some sort of legislative sanction?

Witness: If the Bill passed, I should leave it to the vote of our men to do what they preferred. I may mention that one man said to me: "We should want more money to spend if we left off earlier."

Mr. HOLT: Do you mind telling us what are the hours your men work? The opinion of men as to whether they would rather work an hour earlier or an hour later would be considerably affected by the hours they actually work.

Witness: Our hours are from six a.m. to five p m., with three-quarters of an hour for breakfast, and an hour for dinner. The clerks work from nine o'clock to five o'clock.

The CHAIRMAN: Assuming that you approved of some sort of legislative machinery being applied to the alteration of time, what would you be prepared to recommend—the gradual alteration suggested by the Bill or one alteration of a single hour?

Witness: I think the fewer alterations of the clock the better.

Mr. R. PEARCE (a member of the Committee): I understand all your men work on shifts?

Witness: No; there are day workers, whose regular hours are from six to five, with 1¾ hours for meals. Only the stokers, whose work is continuous, work on three shifts.

This concluded the evidence of Sir George Livesey.

The total gas sent out by the South Metropolitan Company was, for the year 1907, 13,000 million cubic feet. The gas sent out in the four summer months May to August totals:

From 10 to 11 P.M.	276 millions	518 millions
,, 11 to 12 ,,	155 ,,	
,, 12 to 1 A.M.	87 ,,	297 ,,
,, 1 to 2 ,,	55 ,,	
Difference		221 millions.

SWANSEA VALLEY GAS BILL.

House of Commons Committee.—Thursday, May 28.

(*Before the Hon.* ARTHUR STANLEY, *Chairman, Mr.* GEORGE HOWARD, *Mr.* HAWORTH, *and Captain* MURRAY.)

This was a Bill by which the Swansea Valley Gas Company sought to be incorporated and to have further powers conferred on them.

Mr. BALFOUR BROWNE, K.C., Mr. RAM, K.C., and Mr. TREVOR LEWIS appeared for the promoters. Mr. G. J. TALBOT, K.C., and Mr. VESEY KNOX, K.C., represented the Swansea Rural District Council, and Mr. SZLUMPER the Swansea Gas Company, who were in opposition.

Mr. RAM, in opening, said the Bill had passed through the other House; and they now came with the approval of the Government Department, who had reported to both Houses on the measure. The area the Company proposed to serve had hitherto been supplied by the Pontardawe and the Ystalyfera Gas Companies. It was a mining district in the Swansea Valley, about twelve miles in length. The Pontardawe undertaking was purchased by the promoters in 1905, and the Ystalyfera Company in 1907. The purchasers were the vendors to the new Company and were selling at cost price—making no profit out of the transaction. Their only desire was to form a Company who would give an adequate supply of gas to the whole district. The Pontardawe undertaking since it came into their hands had increased very rapidly indeed. In the first quarter of the present year, the output of gas was 23 per cent. greater than it was in the corresponding period of last year; and the consumption for the first year after the purchase was 100 per cent. higher than it was in the year before. With regard to Ystalyfera, this undertaking was only acquired by the promoters last year; and, of course, the growth had not been to the same extent as in the Pontardawe district. There was, however, a great future for Ystalyfera. Agreements had been made with the Local Authorities that pipes should be laid all over the district; and they were looking forward to a very large increased consumption. It was obvious that new works would be required in order to afford a proper supply for the district; and these it was suggested should be constructed at the bottom of the valley. The existing works the Company proposed to use as distributing centres. When the Bill was in the other House, the capital asked for was £50,000; but in conference with the Local Authorities, who desired that the capital should not be unnecessarily large, the Company had reduced it to £30,000. This, it was estimated, would be sufficient for from twelve to fifteen years. The present population of the district was from 25,000 to 30,000; but a new railway was in course of construction, and there was every prospect of a large increase in the near future. There were only two opponents to the Bill—the Swansea Rural District Council and the Swansea Gas Company. He would deal with the Gas Company first. They objected to the name the promoting Company had chosen; and in the second place they said that when the borough of Swansea extended their parliamentary boundaries, the two areas would overlap. In their petition they stated that they were originally incorporated in the reign of George IV. by the name of the Swansea Gaslight Company; that they were re-incorporated in 1881 as the Swansea Gas Company; that their area extended one mile beyond the borough boundaries; that their share capital was £270,000, and their loan capital £57,500; and they went on to say that they objected to the adoption of a name or title so closely resembling their own. In reply, he could only say that the name exactly described the Company. The district they proposed to supply was well known as the Swansea Valley, and was quite distinct from the borough of Swansea. He saw no reason why they should not take a name which really described what they were.

Mr. *E. H. Stevenson* at this point made a communication to Counsel. After the parties had been in consultation a few minutes,

Mr. RAM said: I am very glad to say I have just been informed that an agreement has been arrived at with our two opponents. In the first place we are going to make some little concession to the Swansea Gas Company. We propose to call ourselves the Tawe Valley Gas Company. The Swansea rural district is at the lower end of our area; and we have agreed that the Clayes rural district shall be struck out of our limits, and that our area in Llansamlet shall be confined to that portion of the parish to the north of an imaginary line drawn due east from a point in the centre of the River Tawe, where the Morriston branch of the Midland Railway crosses the river, to the boundary of the parishes of Clayes Rural and Llansamlet, and that the Swansea Rural District Council are to be allowed to test the gas. For the protection of the Swansea Gas Company, we have agreed not to supply gas outside this line. This agreement has enabled us to come to terms with all our opponents.

The CHAIRMAN: It meets the objection of the Swansea Rural District Council?

Mr. VESEY KNOX and Mr. SZLUMPER expressed themselves as quite satisfied.

Mr. RAM: Then nothing remains except to formally prove the preamble of the Bill.

Mr. *Stevenson* having given formal evidence,

The Committee found the preamble, subject to the change of name, proved.

The clauses were then adjusted, and the Bill passed through the Committee.

ELECTRICITY FROM PEAT GAS.

In the House of Commons, on the 21st ult., on the motion of Mr. John O'Connor, it was ordered that the Dublin and Central Ireland Electric Power Bill should be recommitted to the former Committee, with an instruction to them to reconsider their decision on the preamble, except in so far as it related to the City of Dublin, the urban districts of Rathmines, Rathgar, and Pembroke, and King's County. It may be remembered that the Bill, which is to incorporate a Company for the supply of electricity to be generated by gas-engines fed by peat gas over a large area of Ireland, including the places named, came before a Select Committee, presided over by Mr. Luke White, two months ago. Having heard a mass of expert and other evidence, and speeches in opposition to the proposal on behalf of the Dublin Corporation, the urban districts of Rathmines, Rathgar, and Pembroke, and the Alliance and Dublin Consumers' Gas Company, the Committee found that the preamble was not proved. In the ordinary course, the Bill would have failed for the present session; but it was revived by Mr. O'Connor's motion for its reconsideration in an amended form.

It was stated by Mr. Freeman, on behalf of the promoters, that they had now satisfied themselves that they could make the scheme a perfectly remunerative one without including within the area of supply Dublin, Rathmines, Rathgar, Pembroke, and certain parts of King's County. In consequence of the exclusion of these places, the capital had been reduced from £450,000, with one-third borrowing powers, to £150,000, with borrowing powers; and the title had been altered to that of the Central Ireland Electric Power Bill. It was made a condition that before the Company exercised any of the powers granted, they should have raised £50,000 of capital.

Sir Ralph Littler, K.C., who, with Mr. A. M. Paddon, appeared for the Alliance and Dublin Consumers' Gas Company, said the course which had been taken in regard to this Bill was wholly without precedent in his experience at the Parliamentary Bar. He knew of no case where either House had granted a new trial except with the consent of all the parties, which had not been obtained here, or unless there had been some miscarriage. It was a dangerous innovation, and he asked the Committee to refuse to reconsider the Bill.

The Chairman remarked that, with the instruction of the House

before them, he thought they were bound to consider the matter from the point of view of the altered circumstances.

Sir Ralph Littler said in that case he must, on behalf of his clients, respectfully decline to take any part in the discussion.

Mr. Lupton, M.P., and other witnesses having been heard for the promoters, particularly in regard to questions of finance,

The Committee passed the preamble of the Bill, subject to the insertion of clauses for the protection of the water and electric mains and pipes of the Dublin Corporation. The clauses having been gone through and adjusted, the Bill was ordered to be reported.

WATER SCHEMES FOR SOUTH WALES.

The Bill promoted by the Ammanford Urban District Council to sanction and confirm their existing water undertaking, to authorize the construction of new works, and for other purposes, came on May 22 before the Select Committee of the House of Lords, presided over by Lord Ludlow.

Mr. Balfour Browne, K.C., who appeared as leading Counsel for the promoters, stated that, though he was prepared on the previous day to open the case for the Bill, something had occurred since which upset their calculations to a very large extent. They were going to take water from the Loughor, and they had gaugings of the stream which showed that, at the very minimum, it went down to 4,860,000 gallons per day in the driest month of the year. Under these circumstances, as they wanted for Ammanford and the district a million gallons a day, they agreed with the riparian owners (one of them being Lord Dynevor) to give to the stream running down the Loughor 3,500,000 gallons, and to another stream—the Cennen—flowing to the north, 700,000 gallons. These quantities came together to 4,200,000 gallons a day; and as they had 4,800,000 gallons, they had ample water to do it with at the very minimum. On the previous day, however, Lord Dynevor furnished them with gaugings of the stream taken in 1893, which was a very dry year, and the quantity ran down in April, May, and June to 3,903,000 gallons. Under these circumstances, the promoters would get practically no water at all, as they had to give 3,500,000 gallons to the one stream and 700,000 gallons to the other; and they would have to ask Lord Dynevor to rearrange the question of compensation water to the stream, because it would be useless to construct works which were to cost the district £17,000 when they were going to get no water by doing so. The facts had only been made known to him that morning; and he saw no possibility whatever of going on. He therefore asked the Committee for an adjournment, in order that they might discuss the matter with Lord Dynevor and other riparian owners, and see if they could come to some understanding. He believed Lord Dynevor would see that they could not now give the compensation water they had bargained for; and he believed his Lordship would take less for the stream, and so give the promoters some water. Assuming he did so, the promoters could go on with their Bill; but if he did not, all he (Mr. Balfour Browne) could ask the Committee to do would be this: The Council had certain works which were constructed under the powers of the Public Health Act; but they were, in a sense, illegal. They were taking water from the Loughor, and they thought they had the consent of all the riparian owners down the stream. They therefore went on with the works, spent large sums of money upon them, got the water, and were now supplying it to Ammanford. A short time ago, however, two millowners brought an action against them, and said they had no right to take the water, because they had not obtained statutory powers. He was bound to say he thought these gentlemen were probably right; but nobody denied that the promoters must have the water, and none of the petitioners objected to the confirmation of the powers exercised. It was in regard to the further works that the difficulty arose. He could go on with the confirmation part of the case, and there was not the least objection to it; so it would pass as a matter of course.

When the Committee resumed their hearing of the Bill on Monday last week, Mr. Ram, K.C., who appeared for Lord Dynevor, raised an objection with regard to the quantity of water which the Bill provided should flow down into the river. At the previous hearing, Mr. Balfour Browne stated that he could not go on with the new works part of the Bill unless Lord Dynevor agreed to take less compensation water than the quantity provided for in the Bill. Consultations had been held, but Lord Dynevor could not see his way to make any concession. Now the promoters came and asked the Committee to reduce the amount to 3 million gallons per day. Counsel contended that Lord Dynevor and the other opponents ought not to be put to the expense of fighting that which ought not to be allowed. The Chairman, however, decided to hear Mr. Balfour Browne, and the proceedings were resumed.

Mr. Balfour Browne said the cost of the works the Council were seeking to carry out—largely for the benefit of the town, but the reservoir also for the benefit of the stream—would be £17,700. The reservoir would make up the deficiency of the supply, and provide the compensation which was to be given to the streams. By the scheme, they were supplying not only Ammanford and Llandilofawr, but also an important rural district. There was also before the Committee another Bill, promoted by the Llanelly Rural District Council and the Burry Port Urban District Council to take water from the very spring from which they were drawing. The other scheme interfered with their existing pipes, and was costly and extravagant; and they proposed to spend something like £95,000.

Evidence having been given in support of the Bill, the Committee considered the petitions against it; and Mr. Honoratus Lloyd stated the case on behalf of the Llanelly and Burry Port Water Bill.

During the hearing of the petition of the Llanelly Urban District Council, the Chairman stopped the proceedings, and Mr. Balfour Browne addressed the Committee on behalf of the Ammanford Council's Bill.

Eventually the Committee decided, with regard to the Ammanford Bill, that the existing works would be legalized, but that the Council were not to have the extra powers asked for. The Llanelly Bill was rejected.

MISCELLANEOUS NEWS.

MUNICIPAL FINANCE IN MANCHESTER.

Alderman Gibson Protests against the Appropriation of Gas Profits.

By making an increased call upon the Gas, Electricity, and Tramways Departments, and a cutting-down of the estimates of three spending Committees, the Manchester City Council have been able to avoid an increase in the rates for the current year. In fact, the city rate is 6s. $6\frac{4}{10}$d. in the pound against 6s. $6\frac{5}{10}$d. last year. As stated in the "JOURNAL" last week (p. 514), the estimates had been referred back to the Finance Committee with instructions to so reduce them as to prevent any increase in the rates—an appeal being also made to the profit-earning Committees to allocate more out of profits than had been named.

A special meeting of the City Council was held on Wednesday to consider the Finance Committee's report and the revised estimates. Briefly put, the report was that a sum of £7000 should be cut from the estimates, and the Gas Committee be called upon to increase their contribution of £50,000 to £60,000; the Electricity Committee to give £12,000 instead of £10,000; and the Tramways Committee £70,000 in place of £60,000. This would not only prevent the prospective increase in the rates by $1\frac{4}{10}$d. in the pound, but allow a slight reduction on last year's total rate.

In moving the adoption of the report, Alderman Copeland said that, in order to comply with the wish of the Council, they had been compelled to turn to the trading Committees for assistance. He was pleased to say that the Gas Committee, through their worthy Chairman, had shown a desire to give a further sum out of the profits; and the Finance Committee thought the Electricity Committee could well afford another £2000, especially seeing that the Committee had been able to add £40,000 to the renewals and suspense account, against the £30,000 estimated. Dealing with the capital expenditure in non-trading departments, Alderman Copeland said the Finance Committee regarded this expenditure as very serious; and he added that unless an effort was made to check it, there would be no reduction in the rates for a long time to come. In the last ten or eleven years, capital expenditure had increased to the extent of £3,500,000, involving an additional charge of £200,000 on the city rate, or equal to 1s. in the pound.

Mr. W. T. Jackson protested against what he described as "this annual juggling with municipal finance," and claimed that the real line of reform in the direction of economy lay in the readjustment of taxation on the one hand, and the discovery of new sources of revenue on the other. Manchester, he pointed out, was not alone so far as increasing rates were concerned, because they were rising all over the country. He admitted that they were becoming an almost intolerable burden; but if their local taxation could not be reduced, the remedy must be looked for in the direction he had indicated.

Mr. J. H. Thewlis said it was not desirable to put too great pressure upon the trading Committees; and he had hoped there would have been a reduction of the estimates all round, rather than a demand for larger sums from these departments.

After some further discussion, the report was approved and ordered to be entered upon the minutes. The Council then proceeded to deal in detail with the estimates. When the Gas Committee's estimates were put forward,

Alderman Gibson, the Chairman of the Committee, entered his most emphatic protest against the department being called upon for an additional £10,000. He said he was absolutely opposed to subsidizing the rates by contributions from any Committee. Each should be responsible for its own acts and its own expenditure. With the permission of the Council, he would show the effect upon the ratepayers of the contributions made out of the profits of the Gas Department. It might be a relief of the rates, but it was not a relief of the ratepayers. In reality, it relieved only those who could very well afford to pay for themselves. There were 26 consumers who paid the Electricity Committee £56,000 a year for current. The Council took out of the pockets of the gas consumers £2200 odd to pay the rates of these 26 electric light consumers who did not burn gas at all; and this money, moreover, was coming from the poorest gas consumers. Personally, he did not agree with the demand upon the Gas Department for the additional £10,000, because in his opinion it was wrong in principle and unfair in every way. However, he had the authority of his Committee to say that, if the Council said it must be done, they would bow with all humility, as they always had done.

Finally, the estimates (as amended by the Finance Committee) were all confirmed.

BIRMINGHAM CORPORATION UNDERTAKINGS.

Mr. Hack's Retirement.—The Price of Gas.—Water Deficiency.

At the Meeting of the Birmingham City Council last Tuesday—the LORD MAYOR (Alderman Sayer) in the chair—the reports of the working of the gas and water undertakings for the past twelve months were considered.

THE GAS ACCOUNTS.

Alderman Sir HALLEWELL ROGERS moved the adoption of the report (*ante*, pp. 447, 513) of the Gas Department, and said it was a pleasure shared by every member of the Committee to be able to present so satisfactory a result of the year's trading, whereby they were able to increase their cash contribution in aid of the improvement rate by about £4000, and make another record in this direction. He regretted the accidents at the works whereby three men had lost their lives, but assured the Council that these occurrences were not due to any omission to take precautions for the safety of those who worked at an occupation attended by some risks. The Committee had made arrangements for a scheme to adjust and clean incandescent burners on the premises

of consumers. Birmingham was not the first town to move in this direction; the way having been lead by quite a number of others, both large and small. Though the public were only notified of the intention of the Committee a few days ago, the department had already received applications from customers for the cleaning of no less than 2700 burners. He wished to make it clear that this work had been undertaken with no desire to interfere in any way with the business of private gas-fitters. He thought the fitters generally throughout the town would agree that the department were endeavouring to place as much work in their hands as possible. They quoted a price for performing a service which the private gas-fitter did not render; and they endeavoured to protect his trade by arranging that their fitters should be prepared to fix mantles purchased by the consumer. The next matter of interest in the report was the resignation of the Engineer-in-Chief, Mr. Henry Hack, and the consequent rearrangements necessary in the works. Mr. Hack had been connected with the undertaking for the past 36 years, and had been Engineer-in-Chief since 1902. It must be gratifying to him to remember that he had been so closely associated with it during its growth from a comparatively small undertaking till it had become the third largest in the kingdom, and the largest in the Provinces. Mr. Hack was a man of great energy and indomitable perseverance. He never spared himself for a moment in doing what he regarded as being in the best interests of the undertaking. Members of the Council would join with the Committee in trusting that he would be spared for many years to enjoy his well-earned leisure; and they would regret that he was not in very robust health when he took leave of the Committee at the commencement of the present month. As regarded the future management of the Engineering Department, members would remember that on the purchase of the undertaking the Engineers of the two previously existing Companies were retained, and each superintended the manufacture at his respective works. This state of things operated until the retirement of Mr. Charles Hunt in 1902, when Mr. Hack, the remaining Engineer, was appointed Engineer-in-Chief. It was necessary, however, to re-arrange the duties of the Works Superintendents; and they were promoted to the position of "Works Engineers"—having placed in their charge, under the supervision of Mr. Hack, practically the whole administration of their respective works. As a matter of fact, when this re-arrangement was made, each of the Works Engineers took over a part of the duties which had been previously performed by Mr. Hack and Mr. Hunt. The policy had proved to the advantage of the undertaking. Each of the Works Engineers had been connected with the department for some years, and they had all demonstrated their ability to manipulate extensive manufacturing plant and to control large bodies of workmen. He thought it would be only right for the Committee to recognize to some extent the increase of responsibility now placed on the Engineers-in-Charge in the new position made for them. This would be done in a temporary way; and later, if the scheme proved successful, the Committee would report to the Council their recommendations as to larger salaries. The Committee realized their responsibilities; and the Council might be sure that if what they now recommended did not answer, they would not hesitate to say so, and to recommend some other scheme. Turning to the accounts, it would be seen that they contributed directly and indirectly in aid of the city and the area of supply no less than £81,620. It would be remembered that a year ago the price of coal was considerably raised, and there were indications that, in consequence of its greater cost, the charges for gas might have to be increased; but after the contracts were completed and a careful estimate prepared, the Committee concluded that there was no need to raise the price. This decision had been fully justified. At the same time he could not that day—though they were increasing their contribution to the rates to an amount exceeding £60,000—make any definite promise to the consumers as to the future. It must entirely depend upon the price at which they were able to buy coal for next year's trading. The Eight-Hours Bill might increase the price of coal; and the Hours of Daylight Bill, if it became law, would affect all lighting companies. As soon as the coal contracts were arranged, the Committee would go very carefully into the matter; and if it were possible to do anything in the direction of reducing the charges for gas, they would report to the Council. It had not been necessary to borrow any new capital during the year; and, on the other hand, the debt on the undertaking had been reduced by the application of the sinking fund to the extent of £36,923. The capital expended during the year was under £20,000, the principal item of which was £12,382 for new meters. There had been no manufacturing plant extensions of any moment. In the revenue account, "Manufacture of gas" showed an increase of £74,000, due to the greater cost of coal, and to their having carbonized 25,000 tons more to meet the bigger demand for gas, which was equal to 4¼ per cent. over the previous year—a greater increase than in any year since 1900. The sales of gas—£720,000—showed an increase of £33,000; while there were greater receipts for residual products to the extent of £44,000. The increased sales of gas were spread over every class of consumer; fully one-half being for private lighting, 34 million cubic feet for motive power, and the balance for manufacturing and trading purposes. These increases clearly indicated that gas, both as an illuminant and for motive power, was not decreasing in public favour.

Mr. Martineau congratulated the Committee upon the report, and inquired whether any progress had been made in some promised experiments with a view to reducing the number of trenches cut for service laying in the streets.

Mr. Kenrick suggested that the Committee should contemplate an extension of their work by supplying cheap gas for heating purposes. He believed there was an opening of which they might take advantage, to the benefit both of the department and of the public. It might be impossible under their present Acts of Parliament; but he did not think the Corporation of Birmingham need stop on account of Acts of Parliament. It would not be the first time they had had to ask Parliament to grant new powers or to modify old ones. The University had a great deal of information upon gas and gas plant, which it would readily place at their disposal. He believed a supply of a cheaper form of fuel and power would be of great benefit to the city.

Mr. Kelly urged the claims of small shopkeepers to consideration in respect of a reduction in the price of gas.

Mr. Arter complained that the Committee were charging to revenue an excessive amount for repairs to services, which was unfair to the consumers. So far as he could see, a manufacturer paying in rates £120 a year got back as a ratepayer £6; while his contribution to the profit on a consumption of £400 would be £100 a year. A small consumer rated at £8 got 8s. back; while on a consumption of £3, he would contribute 15s. The charges should be reduced in the interests of the consumers; while it would also enable the department to meet the competition of electricity in the outside districts.

Mr. Pentland appealed for a reduction in price on behalf of a considerable number of gas consumers who were among the poorest people in Birmingham—those who used gas through the penny-in-the-slot meters. The time had come when some reduction should be made so far as they were concerned. He also thought something should be done for those who used cooking-stoves.

Mr. Walthall asked if the position of those who used gas for manufacturing purposes other than by gas-engines could be considered. There were manufacturers who employed it for drying and other operations; and it would be an advantage to them if a reduction were made.

Mr. Stephenson congratulated the Committee on their handsome contribution to the city funds. He understood from the Chairman that they contemplated doing without an Engineer-in-Chief. He thought this would be a great mistake. There should be an Engineer-in-Chief, responsible for the whole of the engineering policy.

Mr. Freeman remarked that the Chairman had not taken the Council sufficiently into his confidence as to what the new scheme was going to be. On the point raised by Mr. Stephenson, if the scheme suggested by Mr. Kenrick came within the range of practical politics, it would mean a considerable engineering undertaking. If the Committee in their wisdom decided that the office of Chief Engineer should be abolished, to whom would such an undertaking be entrusted? The abolition of such an important post was a matter for grave consideration.

Mr. Manton pointed out that, if the area of supply of the Gas Department were confined to the city, the question of a reduction in price would be a simple matter. But the district covered a great deal more than the city; and any reduction made would be operative over the whole. He was anxious the small consumer should be considered; but they could not do more for the inside than for the outside consumer. He should like to see a balance struck when they had the report of the Water Committee before them. The Committee were in trouble, for there was a serious deficiency. If the outside water area bore a proportionate share of the loss on the water undertaking, he would be in favour of any reduction in price the Gas Department liked to make.

Alderman Baker remarked that the premises where the explosion took place were only insured to a third of their value. He thought they should be covered by a much larger amount than that.

Alderman Sir Hallewell Rogers said the Committee had not lost sight of the experiment promised in regard to trenches; they were anxious that the streets should be taken up as seldom as possible. He did not quite gather whether Mr. Kenrick wished them to reduce the price of the present gas used for heating purposes, or whether he wished them to make a special gas. They were getting nearer the latter every day; and, in time, they would be able to come to the Council and ask that the candle power of their gas should be reduced. If they lowered the candle power, they would be able to make the gas cheaper. One of the last things Mr. Hack did was to go with the Chief Chemist and one of the Engineers to Germany, and see vertical retorts in operation there. It was said of these that they could make a lower candle power gas, and not reduce the value for engine purposes. At present, if they reduced their candle power from 16 or 17 to 12, the value of the gas for engine purposes would go down slightly. He could not hold out any hope at present of reducing the price of gas used for heating, soldering, and various other purposes; but the matter should have their attention at the earliest possible moment. As to Mr. Arter's remarks, he would be glad if that gentleman would let him have the figures, so that he might go into them. The consumers who used penny-in-the-slot meters should receive attention; but they must wait until the coal contracts for the year had been settled. With regard to the Engineer-in-Chief, what they proposed was merely a temporary arrangement. If the scheme failed, they would come back to the Council, and ask for the appointment of a Chief Engineer. As to what Mr. Manton had said, it was true that any reduction to the consumer inside also meant a reduction to the one outside. He would leave the matter of the water supply to Alderman Beale. With reference to the question of insurance, up to the present they had not insured their buildings to the full. Fortunately, accidents and explosions were rare; and he thought they were safe if they adhered to their present policy.

The report was then approved.

The Water Committee's Report and Accounts.

The Water Committee, in their report, submitted the accounts and balance-sheet of the department for the year ended March 31. The water-rents showed an increase of £2548; being 0·89 per cent. more than the total for the previous year, against an increase of 2·55 per cent. in the last account. The analysis showed that the domestic rental had increased to the extent of 2·17 per cent., against 2·41 per cent. in 1906-7. On the revenue account there was a gross profit of £198,551 last year; being an increase of £6533 over the corresponding figure for 1906-7. The charges on account of capital, shown in the profit and loss account, amounted to a net total of £280,493, and resulted in a deficiency for the year of £81,941, against a corresponding sum of £84,615. The deficiency had been covered by a contribution from the borough fund and rate account to the extent of £65,000, and the transfer from the capital account of £16,941.

Alderman Beale, in moving the adoption of the report, remarked that it was unsatisfactory in one of its most important and essential features. He referred to the growth of the revenue of the Water Department. Of course, they were looking forward to some day when the Committee would work out its own salvation through its normal growth in consumption. There would be good and bad years; and, unfortunately, the past year had been a particularly bad one. Instead of the normal increase they expected of 2½ to 3 per cent., they only had an

increase of something under 1 per cent. But how this arose was very clear from an analysis of the figures. Domestic consumption had held its own very well—it had increased to the extent of 2·17 per cent., as against 2·41 per cent. last year, which was not a very great fluctuation. But in the consumption other than domestic there was a serious falling off, partly due to a check in trade consumption, and very greatly due to the smaller use of water for many public purposes. Trade consumption was entirely beyond their control; and as to the future, none of them were hopeful about trade. Indeed, he thought they would be lucky if they got through the next year without some further serious reduction in trade consumption. But there was a particularly large decrease in the supply for street and road watering and other public uses; and they did not stand alone in this particular. Their neighbours in South Staffordshire had exactly the same thing to complain of. He was afraid that, with improved methods of street paving, less water would be required in future for keeping roads and streets in order. Certainly a hot summer was due to them; and if it came this year, they would see how far this consumption had been affected by improved road construction. As it was, they had to face a most decided check in the growth of trade supply. Notwithstanding this check, however, they had an increase of £6533 in gross profits over last year. He wished he could call this a legitimate gain for the department; but he was afraid he could not. Turning to the revenue account, there was, under the heading "Old supply," a large decrease for pumping and a large increase in maintenance. This was not so much a real difference as a change in the method of apportionment to one head or the other. There was no real variation. In reference to the Elan Valley supply, they were just in the transition period between construction and maintenance. A good many salaries and other expenses hitherto charged to construction were now being charged to maintenance, and therefore came against revenue account to a certain extent. In regard to the hardening process, they were continually making experiments with a view to checking the deleterious action of the water on metal; and he believed they had found what they would be able to use permanently. As to the deficiency, they would have to deal with it by absorption from the rates of £65,000; and they had transferred nearly £17,000 to their capital suspense account. They were allowed to apportion their deficiency in this way until £300,000 was reached. In regard to the increase over the estimate for the Frankley reservoir, this was a matter which could not be foreseen—the Contractors having come upon rock where it was not expected it would be found.

Mr. NEWEY, who seconded the motion, asked if the time had not come when outside authorities, who reaped considerable benefit from the use of the water, should contribute to the extra expense to which Birmingham had been put.

Mr. WALTHALL pointed out that in 1903 the population was estimated at 727,000; while in 1908 it was 799,000. The gross consumption had gone down over 2 gallons per head per day.

Alderman BEALE said he was afraid if they went to Parliament they would only get power to make a merely fractional increase on their present maximum charge for water used for domestic purposes; and it would merely be sanctioned for a temporary expedient. If they could bring domestic consumption down it was a good thing, for it meant that water was not running away which nobody was paying for.

The report was approved.

NOTTINGHAM GAS UNDERTAKING.

Record Profits.

The Annual Report of the Gas Committee of the Nottingham Corporation was issued last week, and it was to come before the City Council at their meeting yesterday.

The Committee state that the quantity of gas sold in the year ending the 31st of March amounted to 1,995,780,900 cubic feet, against 1,927,953,600 cubic feet in the previous year; being an increase of 67,827,300 cubic feet. The total income for the year was £343,993, and the total expenditure £237,743; leaving a balance of £106,250 to be carried to the profit and loss account. After deducting the interest on capital, the sinking funds, and allowing £2000 for the depreciation of stoves, there remains a net profit of £50,317 at the disposal of the Council. The Committee recommend that the sum of £30,000 should be handed over to the Finance Committee in aid of the general district rate, and that the balance (£20,317) should be disposed of as follows: £3000 to be carried to the depreciation fund, £10,000 to the renewals account, and £7317 to the reserve fund and rest account. The Committee also report that a large amount is being spent at the Eastcroft works in renewals and repairs, which, when completed, will put these works in good order. At the Basford works, more than the average amount of repairs has been done during the year. The Radford works are stated to be in an unsatisfactory condition; and the Committee recommend that the sum of £10,000 carried to the renewals account should be spent in building a new retort-house, and putting these works into first-class condition.

The report of the Gas Engineer and Manager (Mr. J. H. Brown) contains the following particulars: The amount spent on the annual repairs and maintenance of works has been increased from £34,243 in 1906-7 to £36,009 in 1907-8. During the year, 193,597 tons of coal and 64,643 gallons of oil were carbonized, yielding 2,108,909,000 cubic feet of gas, or equivalent to a production of 10,821 cubic feet per ton of coal. The gas sold per ton increased from 10,170 cubic feet in 1906-7 to 10,240 cubic feet in 1907-8.—the highest figure in the history of the undertaking. The carbonizing costs per 1000 cubic feet of gas sold, which increased from 2·67d. in 1905-6 to 3·01d. in 1906-7, have been reduced to 2·70d. The reorganized distribution system continues to give satisfaction, and though the loss from leakage, owing to the scattered nature of the area supplied and to colliery subsidences, is still fairly high, the percentage of loss shows a gratifying reduction on last year's figures—viz., from 6·44 to 5·36 per cent.; the latter being the lowest on record.

With regard to residuals, coke showed considerable improvement during the year ending March 31, 1907; but, unfortunately, it is now rapidly falling in value, in sympathy with the coal and iron markets. Chemical products, with the exception of sulphate of ammonia, have very largely depreciated in market value. Fortunately, however, the increased quantity of sulphate produced, and the slightly higher price obtained for it, have more than compensated for the reduced receipts from tar products. The sulphate market continues to show exceptional vitality; and though the production in Great Britain has increased from 60,700 tons from January to April, 1903, to 91,166 tons in the corresponding months this year, or more than 50 per cent., the price continues to be well maintained. Owing to the boom in prices, coal has cost the department £98,446, against £81,948 before—an increase of £16,498, or an average increase of 1s. 5½d. per ton; but, fortunately, this higher expenditure has been made good by the additional sale of gas per ton of coal, and the better return from residuals. The coal market continues to move in favour of the buyer; but Mr. Brown says it is very doubtful whether the reduction in price to be obtained during the current year will be sufficient to balance the inevitable reduction in the value of residuals.

The consumption of gas continued to increase throughout the year, even in spite of the rapidly extending use of incandescent burners. The saving effected by incandescent burners is clearly portrayed by the reduction in the gas consumed annually by the public street-lamps in the city and district—viz., in 1902, 5787; in 1908, 6898. Total consumption of gas in 1902, 115,026,500 cubic feet; in 1908, 86,729,400 cubic feet. But for the cold and inclement weather during last year, the almost universal adoption of incandescent burners would have caused a decrease in the total quantity of gas consumed. The amount of gross profit each year from 1902 is as follows: 1902, £75,927; 1903, £89,141; 1904, £97,037; 1905, £91,941; 1906, £101,221; 1907, £105,752; 1908, £106,250.

The prepayment meters in use continue to increase in proportion to the total number of consumers. This has again raised the average price obtained per 1000 cubic feet of gas sold from 2s. 6·05d. in 1906-7 to 2s. 6·27d. in 1907-8. Deducting the extra amount charged for rent of slot meters and cookers supplied to these consumers, the average price obtained per 1000 cubic feet of gas sold is 2s. 4·61d. The number of meters fixed to the 31st of March (including 456 lamp meters) was 69,546; being an increase of 2701 meters on the previous year. Of these, 66,804 belong to the Gas Department, and 2472 to the consumers. The demand continues for prepayment meters. At the end of the financial year, 28,848 of these were in operation—an increase of 2225 on the previous year. The total mileage of mains is now 370·71; 5·83 miles having been added to the canalization during the year. There were 3350 new gas services laid, against 3192 in the previous twelve months.

The application of gas for trade and domestic purposes other than for lighting continues to increase. There are at present in use about 28,729 gas cooking-stoves, about 13,585 gas-fires, and about 670 gas-engines, besides a very large number of other appliances of almost every description, which have not been numbered. Of the 28,729 cookers in use, 9734 are rented from the department, and 18,293 are supplied with automatic meters rent free. The orders and calls for attention of various kinds from consumers last year were 77,704, against 77,445 in the previous year.

WELSBACH INCANDESCENT GASLIGHT COMPANY.

Directors' Report.

In the "JOURNAL" last week (p. 517), we announced briefly the intention of the Directors of the Welsbach Incandescent Gaslight Company, Limited, to recommend a dividend on the ordinary shares at the rate of 3 per cent. per annum, to place a further £10,000 to the reserve, and to carry forward £5300. We learn from the report that the net profit of the whole undertaking for the year ending March 31 last, including the dividend for the year 1906-7 on the Company's holding in the Austrian Company, amounts to £70,480. Adding £3132 brought forward, makes a total of £73,612. After deducting the interim dividend for the half year (paid on the 1st of January last) on the 6 per cent. preference shares, there remains a sum of £55,615 to be dealt with. The Board recommend that this should be applied as follows: In paying a final dividend on the preference shares, £17,997; in paying a dividend of 3 per cent. upon the ordinary shares for the whole year, £22,295; in adding to the general reserve a sum of £10,000; and in carrying to the credit of next year the balance of £5322. The Board, having carefully considered the present situation and the outlook of the trade, find that it is necessary so largely to employ the reserve fund in the business of the Company that they have decided to discontinue allocating specific assets to this account. Since the end of the financial year, a portion of the securities held for reserve have been utilized in the purchase of the entire share capital of an incandescent mantle factory in Germany. The Company in question, which is stated to be one of well-established repute, doing a good business, has quite recently been acquired on favourable terms. The buildings on the Company's freehold property at King's Cross were completed during the past financial year, and the hope expressed in the last report that some accommodation would be found available for letting on lease has been realized. Part of this spare accommodation is already let. The Board regret that, in spite of a further increase in the volume of trade, the net profit for the year shows a considerable decrease. The last mantle patent expired in 1907. The year under review is therefore the first complete twelve months during which no royalties have been received from this source. In addition, competition has been more severe than ever; and, further, the whole year was one of exceptionally dear money and generally unfavourable conditions. Similar causes operated against the Austrian Company, with the result that their dividend for the past year has been declared, and paid, at the rate of 20 per cent. This dividend represents a sum of about £24,435, and will form part of the profits of the English Company for the year 1908-9.

SOUTH AFRICAN LIGHTING ASSOCIATION, LIMITED.

Decreased Consumption, but Improvement in Business Connections.

The Ordinary General Meeting of the Company was held last Thursday, at the London Offices, No. 90, Cannon Street, E.C.—Sir DANIEL F. GODDARD, M.P., in the chair.

The notice convening the meeting having been read,

Mr. CORBET WOODALL said, before the business was proceeded with, he desired to call attention to one alteration in the print of the report. Since the last meeting of the shareholders, their Chairman had been honoured by His Majesty the King in a way that he (Mr. Woodall) was quite sure was extremely gratifying to them all; and he thought he might, as one who had worked with Sir Daniel in this Company from its inception till now, and knew how much he had done for the Company, take upon himself the voicing of the congratulations of the shareholders upon the honour conferred on him. (Applause.)

The CHAIRMAN acknowledged the kind words and their enthusiastic reception by the shareholders. Proceeding, he moved the adoption of the report and accounts (which were taken as read). He remarked that the first four paragraphs of the report referred to the sale of gas and to the general business of the Association at Port Elizabeth and Grahamstown. In some senses, these features of the year were unsatisfactory, but foreseen. The Directors had followed, with a great deal of anxiety, the slackness of trade and the general depression in South Africa, of which Port Elizabeth had felt the effects to the full; and they had also of late years had to contend with the new enterprise of the Municipality in supplying electricity, and becoming a severe competitor with the Association in lighting the town. Therefore the Directors were not surprised, though they regretted it should be so, that the sale of gas at Port Elizabeth showed a decline. It was not a very serious or a large decrease; and around it he thought were some elements of hope. To his mind, and to that of most of the Directors, the astonishing thing was that they had maintained their position so exceeding well, notwithstanding the adverse conditions with which they had been confronted. In Port Elizabeth, they had practically no street lighting now; and this naturally was a very heavy loss to their account. More than this, the competition of the electric light had taken from the Association a large number of private consumers, and some of the very best of them—those whose gas bills were in the habit of being the largest, such as shops, hotels, and large houses. When he mentioned that the revenue the Council of Port Elizabeth received from private consumers alone last year amounted to about £5000, and when it was remembered that practically all this had come out of the Gas Company's business, he thought the shareholders would agree with the Directors that it was amazing their position had been maintained so well as it had been. While they had to record a certain decrease in the business, on the other side they had to report that the number of consumers of gas had increased during the year in Port Elizabeth by nearly 500. Of course, he did not want to make too much of this. It had been entirely owing to the policy of the Board and to the energy of their Manager, who had taken every opportunity of increasing the number of consumers and making gas as popular as possible. This accounted for the large increase. These consumers, however, were not so large in point of volume of individual consumption as those consumers who had been lost. But the fact of the increase showed that the business was not going down; and when the tide turned (which the Directors hoped would be very soon), they had some good expectation of returning to their former position. The shareholders would realize that, if they had not had this loss in consumers to the electric light, the Association would have had an enormous increase in business, instead of a decrease. With regard to Grahamstown, there they had quite a different state of things. Grahamstown was not much affected by the trade depression. It was largely an educational and residential centre. The Directors were happy to be able to report that there was an increase in the sale of gas there of above 4 per cent. The town, as he had said, had not been affected by bad trade. The farmers in the locality had had a good season; and the number of schools, which were the mainstay of the place, was increasing. So trade was very constant there; and, during last year, the Association had an increase of consumers of from 445 to 483—not very many, but it was not a large town. Respecting coal, he intimated last year that, like all other consumers of coal, the Association would probably have to pay more for it, as all English companies had had to do, but that they hoped to mitigate this by the lower rate of freights. In this way, the Directors had been fairly successful; and so, on the whole, the charge for coal had not increased. It was, in fact, very much the same. The report also spoke of an unfortunate fire that broke out in a building under erection in Grahamstown, and for which the Association were landed with the cost. A company with its head office in England always stood more or less at a disadvantage before a legal tribunal in a country far away. At all events, the case was contested; and the decision was given against the Association. The loss by the fire, and the costs involved in it, would be taken from the reserve fund account next year. The report also dealt with the new shares that were issued to the proprietors in February. This money was needed for many purposes. The Association required for one thing a large trading capital in South Africa. They had sometimes to hold considerable stocks, which involved a substantial amount of money. The Directors had been gradually running stocks down; but it was necessary for carrying on the business on the most economic lines to increase the amount of the capital. They had also to buy more land; and a complete apparatus had been erected for the treatment of ammonia. The plant was now in working order. In prosecution of their plans for providing stoves, fittings, &c., and in increasing the popularity of gas among the smallest consumers in Port Elizabeth, they had also been involved in a large expenditure for mains, services, meters, and so forth. In addition to this, they had put down new engines and exhausters at the works. This accounted for the necessity for the extra capital they had called up. The general result of the account he did not think was unsatisfactory.

Mr. ANDREW L. DON seconded the motion.

Mr. SAMUEL WHILE inquired the amount of the costs incurred in the action to which the Chairman referred.

The CHAIRMAN replied that the whole statement of the costs was not in yet; but the total charge falling on the Company would be something about £1500.

Mr. ALEXANDER MITCHELL: What has been the percentage decrease in consumption in Port Elizabeth?

The CHAIRMAN: About 5 per cent.

Mr. MITCHELL said that he happened to live in a town [Bury St. Edmunds] the affairs of the Gas Company of which it fell to him to manage, where the conditions five years ago were exactly similar to those now being experienced in Port Elizabeth. The Corporation put down an electric light plant, and took the whole of the street lighting from the Gas Company, and naturally some of the best shop and hotel lighting. They had in the town nothing to make them grow as had the Association in Port Elizabeth, in spite of bad trade; but the fact remained that, although the gas consumption fell, through the loss of the public lighting and the loss of private lighting, to the extent of 10 per cent.—that was five or six years ago—they had entirely made it up, chiefly by cooking, and the improvement effected in gas lighting. Although they did not in the town hope to get many consumers off the electric light, still they got some back. It was foolish, however, to imagine they were going to turn the electric light out; but, with improved appliances for lighting and for cooking and heating, the increase in business was continuous, and would be so in greater ratio than in the past. That was his experience in a non-progressive town. When things were better in South Africa, they need have no fear that the electric light, though supplied by the Corporation, would be able to damage the interests of the Association. The reduction in profit suffered in the past year was due not only to reduced consumption, but to the increased price of coal.

Mr. CORBET WOODALL said he should like to say a word or two on the unique position they were facing that day—the first time the Association had gone backward in the matter of revenue. South Africa had ever since he had known it been spoken of as a country of feasts and fasts; and it was now having one of the worst fasts it had had to encounter, not merely in Port Elizabeth and Grahamstown, but in Cape Town, Johannesburg, and in the country generally. The staple industry of the Transvaal was prospering; but possibly, through continuous amalgamations and so on, the state of trade was distinctly bad. He believed, however, that the period of depression that the country was passing through now would, before long, be overtaken by one of recovered prosperity. It was unfortunate that just at this time the Municipality of Port Elizabeth should have elected to put in the electric light. He thought it had been a most unfortunate investment for them, and that the town had cause to regret its action. But at the same time, the Municipality had its duties to perform; and as a progressive town, it wanted to show the latest ideas in lighting as in other directions. The Association had lost the public lighting; and they had lost a certain amount of private lighting. But of the latter he had no doubt they would get back a considerable proportion; and he should be much surprised if the lighting by electricity of many of the side streets of Port Elizabeth was continued for any long period. But whether this happened or not, he agreed with Mr. Mitchell that there was no reason whatever to be concerned about the progress of the undertaking. The probability was that the greater portion of the loss that was being experienced was due to those improvements in gas-consuming appliances to which reference had been made. As shareholders were aware, for example, the quantity of gas now required, as compared with (say) ten years ago, to afford a given amount of light was only about one-tenth. But people did not reduce their accounts to one-tenth of what they were, because they were not content now with the same amount of light that they were formerly satisfied with. The quantity of light was increased, but still the suppliers of the gas did not get anything like the quantity consumed in similar situations as they did ten years ago. This, gas companies thoroughly rejoiced in, because everything that could be done to improve the results obtained from gas they welcomed as adding to the stability of the undertakings. The fact that they were increasing the number of consumers both in Port Elizabeth and Grahamstown was an evidence of the broadening of the base on which the Association's prosperity stood. Regarding the investments of the Association, the reserve fund now amounted to about £30,000, of which £11,000 was invested outside the undertaking; and the balance was used as working capital. As the shareholders were aware, there had been expended in works about £130,000, while the capital raised was £110,000; and, consequently, they had now no working capital, excepting what they had in the accumulated reserve fund. Therefore it was absolutely necessary to increase to some extent the capital of the Association.

The motion was unanimously agreed to.

Proposed by the CHAIRMAN, and seconded by Mr. JAMES MACALISTER, a dividend of 10 per cent. (less the interim payment, and free of income-tax) was declared.

On the proposition of the CHAIRMAN, seconded by Mr. DON, Mr. Macalister was re-elected to his seat at the Board; and on the motion of Mr. ALEX. MITCHELL, seconded by Mr. JOSEPH HEPWORTH, the Auditor (Mr. Percival D. Griffiths, F.C.A.) was re-appointed.

Moved by Mr. JAMES CLOUDSLEY, J.P., and seconded by Mr. SAMUEL WHILE, a cordial vote of thanks was passed to the Chairman and Directors, to the Consulting Engineers (Messrs. Corbet Woodall and Son), to the Secretary (Mr. William Cash), and to the Manager (Mr. William Arnott) and staff in South Africa. The services of Mr. Arnott and his staff were specially commended.

Allocation of Gas Profits at Bury.—At a recent meeting of the Gas Committee of the Bury Corporation, it was reported that the net profit of the gas undertaking in the past financial year was £6258. It was resolved that half this sum should be allocated to the relief of the rates, and the other half returned to the consumers as their share of the profits. The question of the charge for gas for the current year was discussed, and it was decided that the gross price should be 2s. 2d. per 1000 cubic feet, against 2s. 3d. in 1906-7. This year 1d. per 1000 cubic feet will be allowed for prompt payment, and 2d. as share of profits, against 1d. and 3d. last year. This will leave the net price the same as before.

WEST BROMWICH CORPORATION GAS UNDERTAKING.

Reports of the Treasurer and Engineer.

Reports on the working of the West Bromwich Corporation gas undertaking for the year to March 31 last have been prepared by Mr. Thomas Hudson, the Borough Treasurer and Secretary to the Gas Committee, and Mr. Harold E. Copp, the Engineer; and they have just been issued, together with the accounts of the department.

Mr. Hudson says that the loan indebtedness stands at £138,999, a reduction during the year of £1550. The debt, therefore, is now equivalent to 8s. 1d. per 1000 cubic feet of gas sold. The capital account stands at the same figure as in the last report; no outlay having been incurred during the year. The total outlay on this account amounts to £240,605. On revenue account the total income for the year amounted to £58,702, an increase of £1984 over the previous year. Sales of gas amounted to £42,035, an increase of £1361; and sales of residual products, to £15,095, or an increase of £593. A satisfactory increase has been derived from all classes of consumers of gas throughout the borough generally, on account of their greater number, and by reason of climatic conditions; and there has also been a satisfactory increase in the income from residual products, notwithstanding the reduced quantity available for sale in consequence of the introduction of oil gas and the resulting reduction in the coal used in gas making. The total quantity of gas sold was 342,063,740 cubic feet, an increase of 13,586,827 cubic feet, or equal to 4¼ per cent. The amount lost through leakage and condensation was 17,772,260 cubic feet, or equal to 4·86 per cent. Of the 14,732 houses, 5335 are supplied with gas through ordinary meters, and 5710 by means of prepayment meters—a total of 11,045. The number of consumers of all kinds at the end of the financial year was 11,358, an increase of 216. The quantity of gas and residuals obtained per ton of coal bears favourable comparison with previous years. Higher prices, too, have been obtained from residual products. The total expenditure on the trading account amounted to £46,257, an increase over the previous year of £3081. The total manufacturing charges, including maintenance of works and plant, amounted to £33,703, an increase of £2206. Coal used for gas making, though less in quantity, owing to the introduction of oil gas, cost £1276 more, owing to the higher prices—a sum which would have been considerably greater had not some amount of foresight been exercised in its purchase. Workmen's wages for carbonizing purposes show a reduction of £375, owing to the introduction of retort-house machinery; and it must be remembered that this reduction is in addition to a reduction of £380 the previous year. Fuel for firing is higher by £212, as also is the cost of purification by £350. The expenditure on maintenance and up-keep shows an increase of £532, and sundry manufacturing expenses and costs have also increased by £155. Though the expenditure for the year reveals the increases referred to, it must be remembered that the production and output of gas has also been increased, involving a correspondingly greater outlay and expense. The maintenance and renewal of mains, service-pipes, and meters cost £1564, or £88 more. The total length of mains at the end of the year was 46 miles 1176 yards; the number of consumers per mile of main was 243; and the quantity of gas sold per mile, including public lighting, was 7,329,727 cubic feet. The cost of public lighting (apart from the gas supplied) is £59 over last year, owing to an increase in the number of lamps, which now totals 1080. The department supplied upwards of 20 million cubic feet of gas last year for the public lighting of the borough—a record quantity, notwithstanding the considerable extension of incandescent lighting. The improvements made in the public lamps in recent years, while resulting in better lighting of the streets, have necessarily affected the quantity of gas consumed, which shows a considerable increase when compared with four or five years ago. This is a point of some importance to the Gas Committee, in view of the price charged; and in this connection it may be observed that the difference in price at which gas was supplied for public lighting, in comparison with the statutory price, amounted last year to the sum of no less than £1260; in other words, the gas undertaking contributed this amount to the district rate through the public lighting account, apart from the direct contribution of £1000 out of profits. The gross profit on the trading account is £12,445, against £13,542, or a reduction of £1097. The balance standing to the credit of the profit and loss account at the commencement of the year was £14,611, of which the sum of £1000 was transferred in relief of the general district rate, in pursuance of the minute of the Town Council, and £2782 was transferred to the credit of the extensions suspense account; leaving a net balance of £10,829 to be brought forward. The gross profit of £12,445 has been charged with the interest on loans and Corporation stock, and the proper instalments for the redemption and extinction of the debt, amounting altogether to £8331, leaving a balance and surplus for the year of £4114, as compared with £5106 the previous year. The debit balance on the extension suspense scheme account has been reduced during the year by £2782 transferred from the profits of the previous year, leaving a balance of £10,254 to be still provided, but which could be more than liquidated by the amount of the unallocated profits in hand.

Mr. Copp in his report says that one of the gasholders is now in the hands of contractors for the addition of a new outer lift, which will increase its capacity from 658,000 to just over 1,000,000 cubic feet. During the year a considerable amount of work has been done at the expense of the revenue account, including the erection of a plant for the gasification of oil, the total cost of which was just over £300. Oil gas used as an enriching agent imparts to the mixture of coal and water gas a greater heating power than benzol, which was formerly the only enriching agent employed. Though the plant has only been at work at intervals since November last, the average calorific power of the town gas during the year has been 621 B.Th.U., as against 615 B.Th.U. during the previous year, notwithstanding an increased proportion of water gas being used. A new gangway for facilitating the loading of coke-trucks has been erected, and also a stage for the loading of canal barges with coke. The light railway has been extended for the purpose of lessening the cost of conveying coke to the water-gas plant. Since the installation of the water-gas plant in 1901, great difficulty has been experienced in obtaining an adequate water supply at the works; and after much consideration, it was decided to pump the necessary water for cooling and scrubbing the water gas from No. 1 holder tank, and to return it to the tank after passing it through a filter and cooler. The new stoking machinery has worked in a very satisfactory manner during the past year; the maintenance of the plant being 0·42d. per ton for the discharging machine, 0·18d. per ton for the charging machine, and 0·08d. per ton for the engine and dynamo—a total of 0·68d. per ton. The carbonizing and coke wages amounted to 1·65d. per 1000 cubic feet of gas made, as against 2·13d. last year. The carbonizing wages alone amounted to £2230, as compared with £3023 during 1905-6, when West's stoking machines were in use, or a saving of £793, in spite of the increased gas production; and if the cost were based on equal quantities of gas made, it would mean a saving of £985 per annum in favour of the new machinery. The total wages at the works were £2659, as against £3129 the previous year. The cost of purification was £1106, as against £776. This increase is doubtless in large measure due to the greater percentage of water gas made—namely, 11·14 per cent., as against 8·48 per cent. The coal and water gas are mixed at the condensers, and it is therefore impossible to ascertain the relative costs of purification. The chief impurity contained in the latter is carbonic acid, necessitating the use of lime for its removal. The average amount of this impurity at present is 6·3 per cent.; and by the Dellwik system, as installed at the works, it is impossible to materially decrease this without very seriously diminishing the yield of gas per ton of coke. It will therefore be necessary, when a new generator is installed, to considerably modify its design. During the past year, in order to remove the carbonic acid from the gas (water gas and coal gas), it was necessary to use 5·14 lbs. of lime per 1000 cubic feet, against 3·81 lbs. the previous year; and 27 more purifiers were changed. The quantity of coal carbonized during the year was 28,945 tons, yielding 324,529,000 cubic feet of gas, or 11,208 cubic feet per ton, as against 10,750 cubic feet per ton last year. The volume of water gas made was 39,617,000 cubic feet, or 56,435 cubic feet per ton of coke, as against 59,103 cubic feet per ton last year. The quantity of oil used was 14,951 gallons, yielding 1,099,600 cubic feet, or 19,290 cubic feet per ton of oil. The total quantity of gas made was 365,246,000 cubic feet, an increase of 13,559,000 feet, or 3·86 per cent. The yield of tar was 10·1 gallons per ton of coal, and of ammoniacal liquor 32·9 gallons per ton of coal. The ammonium sulphocyanide recovered amounted to 1·44 lbs. per ton of coal carbonized; the value being £87. The quantity of broken and sized coke sold continues to increase, amounting during the year to 4359 tons.

The supply of gas to the Hall Green district during the winter season has been the subject of complaint for several years. An apparatus for automatically increasing the pressure, operated by means of a water-motor, has been installed, with highly satisfactory results. As to the public lamps, a new system of automatic lighting is being tried. The automatic lighting of street-lamps is a matter of peculiar difficulty in West Bromwich. The type of apparatus operated by clockwork is found to be adversely affected by locally prevailing atmospheric conditions; while that operated by the gas pressure is somewhat unreliable, especially during the months of heavy consumption, as the mains in some parts of the borough are at such times overworked—an adequate supply of gas having to be maintained by a large increase of pressure at the works, which is liable to operate the machines when it is not desired to do so.

RIPON CORPORATION GAS UNDERTAKING.

Mr. Isaac Carr on the Condition of the Gas-Works.

In accordance with instructions received from the Town Clerk of Ripon (Mr. M. Kirkley), Mr. Isaac Carr, of Widnes, recently inspected the gas-works of the Corporation and the district supplied therefrom; and he has presented his report, from which we take the following particulars.

Starting with the retort-house, the special matter to which Mr. Carr's attention was first directed by the Gas Committee was the square brick chimney of the old retort-house, which was erected about fifty years ago. It is 52 feet high, 7 feet square at the base and 6 feet square at the top, in 14-inch brickwork; and it is 9 inches out of plumb, due to subsidence. The settlement, which is in the direction of the retort-bench, is causing a slight crushing and uplifting movement on the arch of the first bed of retorts. Mr. Carr does not consider there is any danger of collapse to either the chimney or the bench as they stand at present; but he recommends that the former should be straightened, and that when this has been done the coal-shed end of the bench should be braced with vertical stays in the same manner as is now done at the chimney end. Various alterations in the retort-house are suggested; and Mr. Carr points out that an even and light seal on the dip-pipes, with a steady control from the exhauster, is necessary, if the best carbonizing results are to be obtained. He considers the present coal-storage sufficient, and the carbonizing plant, which is 80 per cent. in excess of the maximum daily make, ample. Some of the retorts in the new house, however, require resetting, as the customary cross walls over the top retorts appear to have been left out. The introduction of these walls will, Mr. Carr says, add materially to the working life of the retorts.

After a few remarks on the condensing plant, the tar and liquor stores, and the exhausters, Mr. Carr goes on to say that there is no washer of the tar-extractor type on the works, and he recommends that one suitable for 500,000 cubic feet per diem should be obtained. This apparatus, if of the Livesey type, would, in addition to taking out the tar, also remove a considerable portion of the ammonia, and so, to some extent, relieve the work of the scrubbers. These at present must be highly charged with tarry matter, which greatly impairs their usefulness in the purification of the gas from ammonia. There is in use one tower scrubber, 5 ft. 6 in. in diameter and 20 feet high, fitted with wood grids, and a second scrubber of similar size adjoining the mess-room, not in use. There is also one of Clapham's rotary scrubber

washers, which on a test appeared to be removing the last trace of ammonia from the gas. If the tar-extractor already recommended were fixed, and the second tower scrubber by the mess-room removed and brought into use, Mr. Carr says, the scrubbing plant would be sufficient for a make of gas considerably in excess of the present maximum. The four luted purifiers, which are 15 feet square and 5 feet deep, are of sufficient capacity for double the present maximum daily make of gas. While the cost of purification is not excessive, the effectiveness of the oxide of iron used must, in a measure, be impaired by the fine tarry matter coming over in suspension with the gas from the scrubbers. No trace of tar could be found in the gas at the outlet of the first purifiers; but the Manager (Mr. W. T. Lancaster) stated that a little tar was found at the bottoms of the purifiers at the times of changes.

There is one station meter, of 15,000 cubic feet per hour capacity, which Mr. Carr says is ample for present requirements. There are two gasholders—No. 1 a three-lift, with a capacity of 123,000 cubic feet, and No. 2 a two-lift, of a capacity of 120,000 cubic feet—making the total storage 243,000 cubic feet. As the tendency of the day consumption is to increase at a greater ratio than that of the night (owing to the more general use of gas for domestic purposes other than lighting), no question of gasholder extension will need to be considered until the consumption per day is 70 to 80 per cent. of that at present recorded.

In the sulphate of ammonia plant, Pettigrew's patent stills appear to be capable of treating 5 tons of ammoniacal liquor per diem, or equal to a production of (say) 10 cwt. of sulphate. The Manager reports that he has not found the plant to work satisfactorily; and Mr. Carr says that, having regard to the fact that the production during the last two years has been less than 22 lbs. of sulphate per ton of coal carbonized, and the previous two years only just over 22 lbs., there is certainly something wrong, as with Aldwarke Main coal it ought not to be under 27 lbs. The superheater appears to be of insufficient size, which involves loss of waste heat and consequent increase in the fuel account. The lead lining of the sulphate-store is laid in a faulty manner. The mother liquor tank is small, and should be made at least three times its present size. The draining-table is also defective. Mr. Carr states that at least £100 per annum better return could be obtained from the sulphate plant than is now being done, by careful attention to various points he names, and assuming that the manufacturing operation is properly and carefully conducted—*i.e.*, that all the ammonia is distilled from the liquor, and none allowed to escape through the acid solution in the saturator.

Coming to the distributing plant, Mr. Carr says there is a fairly good pressure throughout the whole area of supply, which indicates that the mains for the most part are of sufficient capacity. The leakage or unaccounted-for gas is high; but last year's figure—8·1 per cent., compared with 11 per cent. before—shows that improvement is being made. Much of this excessive leakage has, it was explained, been due to the careless and unworkmanlike manner in which the main and service laying has been carried out in the past.

With regard to the cost of manufacture and distribution, &c., Mr. Carr gives in an appendix an analysis of the accounts of the gas undertaking for the last four years, showing the net cost of manufacturing gas per 1000 cubic feet at the works, the cost of distribution, and the total cost including all charges. Side by side with these figures, he has inserted, for comparison, his own figures of cost at Widnes. The carbonizing costs at Ripon he regards as very satisfactory; but those for repairs and maintenance of works and for distribution are excessive, especially in 1905-6-7. Last year's results (see *ante*, p. 514), while still very heavy, show, he says, a marked improvement; but these are, in his judgment, capable of at least a still further reduction of 25 per cent. The Manager's explanation of the excessive expenditure on works and mains is that it was rendered necessary on account of the dilapidated condition in which he found everything at the time of his appointment. Mr. Carr says that the leakage is now showing signs of improvement, and the works generally are in a creditable state of repair; so that the further economies he has indicated will, he is sure, follow on determined and continuous application on the part of the management.

As to the price and quality of gas, Mr. Carr points out that the present outstanding capital debt on the undertaking is an exceedingly low one—*i.e.*, £380 per million cubic feet of gas sold; and he says that the present charges for gas, compared with works of like size and locality for coal, are not excessive. Having regard, however, to the fact of the producing capacity of the works being practically double that of the present demand, it occurred to him that the price might with advantage be reduced. The effect of a reduction would be to encourage existing consumers to extend the use of gas not only for lighting, but probably for cooking, heating, and motive power. Further, as there are still 25 per cent. of houses in the city not at present using gas, a reduction in price would most surely induce many of these to become consumers. He is very strongly of opinion that the effect of a substantial reduction would be mutual. While the consumers would enjoy the benefits of lower charges, the Corporation, as the authority, would, on account of the increased consumption, suffer little, if any, diminution in the amount of the surplus profits accruing from the works at the present time. The illuminating power of the gas—15½ candles—Mr. Carr regards as a satisfactory and a sufficiently useful quality, from the consumers' point of view. He explains that, when speaking of 15½-candle gas, this figure is as ascertained by the No. 1 "London" argand burner; but if the "Metropolitan" No. 2 argand burner were used, the photometrical value of the Ripon gas would be increased to 17½ candles.

Mr. Carr concludes by saying that during the period of his visit he had a conversation with the Manager. Judging from this and subsequent correspondence, he has pleasure in saying that he regards him as a well-trained and capable man, anxious to use every effort to secure the best results from the department for which he is responsible.

Sulphur in London Gas.—At the meeting of the London County Council last Tuesday, the report of the Public Control Committee on the above subject which was given in the "JOURNAL" last week (p. 512) was received and unanimously adopted.

BOLTON CORPORATION GAS DEPARTMENT.

The Past Year's Working.

The Gas and Lighting Committee of the Bolton Corporation have issued their report and accounts for the year ending the 31st of March last. They show that the sale of 958,691,000 cubic feet of gas for private and public lighting produced (less discounts) £117,709; the sale of residuals, £41,474; and other receipts brought up the revenue to £160,568, compared with £156,236 for the preceding year. The expenditure on the manufacture of gas was £83,954 (coal and cannel costing £55,755, compared with £47,425); on distribution, £9119; on management, £1898; and the total expenses amounted to £103,973, against £94,035. The balance carried to the profit and loss account this year is £56,595, compared with £62,201 before. The total at the credit of the profit and loss account is £56,642; and it is disposed of as follows: Annuities, £5328; interest on loans and deposits, £3677; dividend on corporation stock, £12,369; sinking fund, £3945; bank commission, £29; district funds account, £20,000; reserve fund account, £11,294. The total of this account is £20,049; and last year it was drawn upon to the amount of £4282 for the renewal of mains, and £3119 for the renewal of meters—together, £7401; leaving a balance of £12,648. In their report, the Committee emphasized the importance of maintaining at a high level the amount standing to the credit of the fund, in view of the urgent and costly works of reconstruction in progress and in contemplation. They stated that, notwithstanding the high price paid for coal, the net result of the year's working had been a disposable balance of £31,294, of which (as shown above) they had voted £20,000 in aid of the district rates, and carried £11,294 to the credit of the reserve fund account. Included in the report are the following comparative statistics of working:—

	1908.	1907.
Tons of coal and cannel carbonized	99,635	97,404
Average cost per ton, delivered on the works and trimmed	11s. 2¼d.	9s. 8¾d.
Percentage of cannel used	1·33	0·04
Gas made, cubic feet	1,022,493,000	1,001,020,000
" " " per ton of coal and cannel carbonized	10,262	10,277
Gas accounted for, cubic feet per ton	9,716	9,740
Gas unaccounted for, per cent.	5·32	5·22
Maximum quantity of gas supplied in 24 hours during the year, cubic feet	5,714,005	5,939,000
Minimum quantity supplied "	879,000	806,000

COVENTRY CORPORATION GAS UNDERTAKING.

The Past Year's Working.

In submitting the accounts of the Coventry Corporation gas undertaking for the year ended the 31st of March last, the Gas Committee state that the total borrowing powers exercised since the acquisition of the gas-works amount, with nominal additions, to the sum of £424,018, of which £31,340 has been repaid out of the sinking fund. The present liabilities are therefore £392,678. Against this, the Corporation have reserve and sinking funds invested amounting to £49,046; leaving a balance of liability of £343,632. The amounts expended during the year on capital account were as follows: Structural works (Foleshill site), £46,957; new mains and service pipes, £5016; and new meters, £1742—total, £53,715. The total capital expenditure since the acquisition of the undertaking, including the original purchase-money, amounts to £407,952; and the balance of unexpended capital is £16,066. The total revenue for the year amounted to £130,809; and the expenditure for coal and other materials, wages, repair and maintenance of works, &c., came to £103,979—leaving a gross profit of £26,830. To this has to be added the amount carried forward from last year and interest received from the Barnsley Corporation; making a total of £29,043. Against it, however, are capital and other charges amounting to £19,090; leaving a final balance of £9953. In 1903, the Council, on the recommendation of the Gas Committee, raised the limit of the reserve fund from £8000 to £10,000. The amount of the fund at the present time is £9897; and in the opinion of the Committee the limit should be increased to £15,000. They recommend that out of the available profit £3000 should be paid over to the relief of the rates, £6000 set aside to meet the loss of capital consequent upon the abandonment of plant at the old gas-works when the new works at Foleshill are in full operation, and the balance of £953 carried forward.

DEVONPORT CORPORATION WATER UNDERTAKING.

Result of the First Complete Year's Working.

In view of the capital liabilities still to be incurred by the Devonport Corporation, considerable interest is being manifested in the borough in the accounts of the water undertaking, which were presented by the Borough Treasurer (Mr. H. J. Hoare) at a meeting of the Water Committee last week. The twelve months ending the 31st of March last which these accounts cover is the first complete year in which the undertaking has been under municipal control; for though the Act of Parliament authorizing the purchase was passed as long ago as 1902, it may be remembered that the actual transfer did not take place until July 1, 1906. Last year's accounts, therefore, dealt with the period of nine months ending March 31, 1907.

In the year lately completed, the total revenue of the undertaking amounted to £17,949, of which £17,009 was for water supplies; the balance being made up of meter-rents, receipts for private work, &c. The expenditure was £6333; leaving a gross profit of £11,616. This was increased by bank interest to £11,642. Out of this sum, £10,320

was paid as interest on loans, £865 was devoted to the repayment of loans, and £11 was paid for bank interest; leaving a balance of net profit amounting to £445 to be carried to the reserve fund. Mr. Hoare appends a working statement, in which the following comparison is made between the financial year 1907-8 and the nine months of 1906-7 covered by the previous accounts:—

	1907-8. £ s. d.	Per 1000 Gallons. d.	1906-7. £ s. d.	Per 1000 Gallons. d.
Gross income	17,668 11 10	4·503	13,783 19 7	5·254
Total working expenses	6,052 7 7½	1·543	4,477 1 11	1·707
Profit on trading	11,616 4 2½	2·960	9,306 17 8	3·547
Capital charges	11,170 15 5	2·847	9,226 19 2	3·517
Net profit	445 8 9½	0·113	79 18 6	0·030

The difference between the sum set down in this table as "gross income" and that given above as "total revenue" is mainly due to the omission from the table of the amount received for private work. The expenditure on this work is also ignored in calculating the total working expenses. It will be seen that the sum set aside for the repayment of loans is very small, being only £865, against £10,320 for interest. This arises from the fact that payment to the sinking fund on the purchase price of the undertaking does not begin until 1911. In the meantime, the cost of the Act of Parliament is being paid off; and this loan will be extinguished next year. The capital indebtedness up to March 31 was £28,026.

During the past year, good progress was made with the laying of the pipe-line which is to take the place of the open leat running between Dousland and Roborough, a distance of 5¼ miles. This work is now approaching completion. Up to March 31, the expenditure on account of it was £9545. A service-tank is also being constructed at Dousland; and it is anticipated that this too will be finished in time to prevent any risk of a repetition of the experience of last winter, when, owing to the open leat being blocked with snow and ice, Devonport was for several days without water, except such as could be spared for its use by the Plymouth Corporation. This troublesome experience cost Devonport upwards of £400, out of which £99 was paid to Plymouth for water, and more than £300 went in the wages of men employed in the vain endeavour to clear the leat of ice.

Though the liabilities of the undertaking will be seriously increased when the repayment of the loans begins, the members of the Water Committee entertain the hope that it will be possible to meet them without imposing a water-rate. They are encouraged in this expectation by the greater demand for water. Last year the number of houses supplied increased by 434, and at March 31 reached a total of 9039. From each of these houses an average of £1 19s. 1d. was received for water; and the net profit was 1s. per house. It is notable, as evidence of the still overcrowded state of portions of the borough of Devonport, that the average number of persons per house supplied is estimated to be as high as eight. The consumption of water is increasing, both actually and relatively, and has reached the high average of 35·58 gallons per head per day, against 32·30 gallons in the previous year. The capital works out at £311 10s. 11d. per million gallons of water supplied; and the profit at 3·969 per cent. on the capital employed. There are 61 miles of mains, and 451 meters on hire.

A SOMERSET WATER QUESTION.

Peculiar Opposition to a Pure Supply.

Some remarkable evidence was given at a Local Government Board inquiry held last Wednesday week at the parish of Stoke St. Gregory, Somerset, respecting a proposed new water supply for the surrounding district.

The inquiry was conducted by Mr. A. G. Drury, one of the Board's inspectors, and was the result of an agitation which has been going on for some years to provide a proper water supply for a population of 1330 residents. Stoke St. Gregory is a typical Somerset agricultural district, situated about 8 miles from Taunton. Of the residents, it is estimated that between 400 and 500 are at present obliged, from want of any other supply, to use for drinking purposes the water from the tidal river Parret.

Mr. G. Musgrave, Chairman of the Stoke St. Gregory Parish Council, said he resided close to the river bank, and had seen dead cats and dogs come up with the tide. It was also common knowledge that the sewage of various towns flowed into the river. Some of the people boiled the water before drinking it; others consumed it just as it was taken from the river. As a member of the Parish Council, he had been advocating a proper supply of water for some years past.

Mr. W. F. B. Dawe, Clerk to the Taunton District Council, appeared for that Authority, who supported a scheme which had now been formulated by Messrs. Merryweather and Sons, of London, to provide a new supply of water to the district; and Mr. Gordon W. Harris, an Engineer representing the firm, explained the scheme, whereby it was proposed, with the consent of Lord Portman, who was willing to grant a lease for 40 years, to obtain water from hills on his land some few miles distant—the estimated cost of the undertaking being approximately £7564, exclusive of the cost of land, engineer's fees, &c. This would provide a reservoir with 50,000 gallons capacity; and there was a plentiful supply of water on the hills. It was proposed to obtain the Local Government Board's sanction for a loan spread over 40 years, to cover the expenditure. It was estimated that a special rate of 1s. 3d. in the pound would cover the outlay. Messrs. Merryweather had only been called upon for advice; and if the scheme were approved, the work would be open to tender.

Dr. H. J. Alford, Medical Officer of Health for the Taunton Rural District and County Analyst, gave evidence as to the need for a pure supply of water for the district in question, and said that many of the wells from which those inhabitants who lived inland and away from the river obtained their drinking water were polluted with sewage; and his analysis showed that the water, particularly that from the river, was unfit for dietetic purposes.

Mr. W. W. Goode, Solicitor, of Langport, appeared on behalf of several residents—principally owners of land and farmers—who opposed the scheme; their chief contention being that the district could not afford such an expenditure. Evidence was given that the people who drank the river water lived to a good old age. Moreover, 8 per cent. of the inhabitants had signed a petition against the new supply, on the ground of the expense.

Mr. Drury, at the close of the inquiry, visited the source of the fresh supply on Lord Portman's estate, where abundant water was found.

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 555.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
590,000	10	Apl. 10	10	Alliance & Dublin 10 p.c.	19—20	..	5 0 0
868,324	10	,,	7	Do. 7 p.c.	13—14	..	5 0 0
310,000	Stk.	Jan. 16	4	Do. 4 p.c. Deb.	100—103	..	3 17 8
200,000	5	May 29	6½	Bombay, Ltd.	6—6½*	..	5 0 0
40,000	5	,,	6½	Do. New, £4 paid	4¼—4¾*	..	5 9 6
50,000	10	Feb. 27	14	Bourne-mouth Gas and Water	10 p.c.	27—28	.. 5 0 0
51,810	10	,,	7		B 7 p.c.	16½—16¾	.. 4 3 7
53,200	10	,,	6		Pref. 6 p.c.	14—15	.. 4 0 0
380,000	Stk.	,,	12½	Brentford Consolidated		240—245	.. 5 2 1
300,000	,,	,,	9¼	Do. New		180—185	.. 5 2 8
50,000	,,	,,	5	Do. 5 p.c. Pref.		118—123	.. 4 1 4
206,250	,,	Dec. 13	4	Do. 4 p.c. Deb.		100—105	.. 3 16 2
220,000	Stk.	Mch. 12	11½	Brighton & Hove Orig.		202—207	.. 5 8 8
246,320	,,	,,	8½	Do. A. Ord. Stk.		152—157	.. 5 5 1
460,000	20	Mch. 27	10	British		41½—42½	.. 4 14 1
104,000	Stk.	Feb. 13	6	Bromley, Ord. 5 p.c.		116—119	.. 5 0 10
165,700	,,	,,	4½	Do. do. 3½ p.c.		86—89	.. 5 1 2
500,000	10	May 14	7	Buenos Ayres (New) Ltd.		10¾—11¼*	.. 6 4 5
250,000	Stk.	Dec. 13	4	Do. 4 p.c. Deb.		93—95	.. 4 4 3
150,000	20	Mch. 12	7½	Cagliari, Ltd.		24—25	.. 5 16 0
100,000	10	—	—	Cape Town & Dis., Ltd.		4—6	.. —
100,000	10	Apl. 26	4½	Do. 4½ p.c Pref.		5—7	—2 6 8 7
50,000	50	May 2	6	Do. 6 p.c. 1st Mort.		46—48	.. 6 5 0
103,000	Stk.	Dec. 30	4½	Do. 4½ p.c. Deb. Stk.		92—94	.. 4 15 9
157,150	Stk.	Feb. 27	5	Chester 5 p.c. Ord.		111—113	.. 4 8 6
1,493,280	Stk.	Mch. 12	5⅛	Commercial 4 p.c Stk.		104—109	.. 4 15 5
500,000	,,	,,	5	Do. 3½ p.c. do.		100—105	.. 4 15 3
475,000	,,	Dec. 13	3	Do. 3 p.c. Deb. Stk.		32—84	.. 3 11 5
800,000	Stk.	,,	6⅛	Continental Union, Ltd.		115—120	.. 5 8 4
200,000	,,	,,	7	Do. 7 p.c. Pref.		140—145	.. 4 16 7
460,170	Stk.	—	5⅛	Derby Con. Stk.		122—123	.. 4 9 5
55,000	,,	—	4	Do. Deb. Stk.		103—105	.. 3 16 2
148,995	,,	Mch. 31	5	East Hull 5 p.c. Ord.		100—103	.. 4 17 1
486,090	10	Jan. 30	12	European, Ltd.		23—24	.. 5 0 0
354,060	10	,,	12	Do. £7 10s. paid		16¾—17¾	.. 5 2 10
15,182,590	Stk.	Feb. 13	4⅛	Gas-light and Coke	4 p.c. Ord.	93—95	—½ 4 12 7
2,600,000	,,	,,	3⅜		3½ p.c. max.	87—90	.. 3 17 9
3,799,735	,,	,,	4		4 p.c. Con. Pref.	106—109	.. 3 13 5
4,193,975	,,	Dec. 13	3		3 p.c. Con. Deb.	83—85	.. 3 10 7
258,740	Stk.	Mch. 12	5	Hastings & St. L. 3½ p.c.		93—93	.. 5 2 0
82,500	,,	,,	6⅛	Do. do. 5 p.c.		112—115	.. 5 13 1
70,000	10	Apl. 29	11	Hongkong & China, Ltd.		18—19	.. 5 15 9
4,940,000	Stk.	May 14	8	Imperial Continental		177—180	+2½ 4 8 11
473,600	Stk.	Feb. 13	3½	Do. 3½ p.c. Deb. Red.		93—95	.. 3 13 8
195,242	Stk.	Mch. 12	6	Lea Bridge Ord. 5 p.c.		113—118	.. 5 1 8
£			p.c.				£ s. d.
561,000	Stk.	Feb. 27	10	Liverpool United A		227—229	.. 4 7 4
718,100	,,	,,	7	Do. B		164—166	+1 4 4 4
306,083	,,	Dec. 30	4	Do. Deb. Stk.		106—108	.. 3 14 1
152,736	Stk.	Feb. 13	7⅜	Maidstone 5 p.c.		136—141	.. 5 8 2
75,000	5	Nov. 28	5	Malta & Medn., Ltd.		4¼—4¾	.. 5 5 3
560,000	100	Apl. 1	5	Met. of Melbourne	5 p.c. Deb.	100—102	.. 4 18 0
250,000	100	,,	4½		4½ p.c. Deb.	100—102	+1 4 8 3
541,920	20	May 29	3½	Monte Video, Ltd.		10½—11¼*	.. 6 1 9
1,775,892	Stk.	Feb. 27	4⅜	Newc'tle & G'tesh'd Con.		107—108	.. 4 5 8
418,460	Stk.	Dec. 30	3½	Do. 3½ p.c. Deb.		90—92	.. 3 16 1
15,000	10	Feb. 27	10	North Middlesex 10 p.c.		20—21	.. 4 15 3
55,940	10	,,	7	Do. 7 p.c.		13½—14½	.. 4 16 7
300,000	Stk.	Apl. 29	8	Oriental, Ltd.		140—143	.. 5 11 11
60,000	5	Mch. 27	7	Ottoman, Ltd.		6—6½	.. 5 7 8
398,490	5	Apl. 29	7	Primitiva Ord.		5⅜—6¼	—½ 5 12 0
796,980	5	Jan. 30	5	Do. 5 p.c. Pref.		4¾—5	—⅛ 5 0 0
488,900	100	Dec. 2	4	Do. 4 p.c. Deb.		93—95	.. 4 4 3
1,000,000	10	Apl. 29	8	River Plate Ord.		12⅞—13⅛	.. 5 18 6
312,650	Stk.	Dec. 30	4	Do. 4 p.c. Deb.		93—95	.. 4 4 3
250,000	10	Apl. 10	8	San Paulo, Ltd.		13⅜—14	.. 5 14 4
125,000	50	Jan. 2	5	Do. 5 p.c. Deb.		50—52	.. 4 16 2
135,000	Stk.	Mch. 12	10	Sheffield A		245—247	.. 4 1 0
209,984	,,	,,	10	Do. B		245—247	.. 4 1 0
523,500	,,	,,	10	Do. C		245—247	.. 4 1 0
70,000	10	May 29	10	South African		14—15*	.. 6 13 4
6,429,895	Stk.	Feb. 13	5⅛	South Met., 4 p.c. Ord.		118—120	.. 4 8 10
1,895,445	,,	Jan. 16	3	Do. 3 p.c. Deb.		83—85	.. 3 10 7
209,820	Stk	Mch. 12	8	South Shields Con. Stk.		154—156	.. 5 2 7
605,000	Stk.	Feb. 27	5⅛	S'th Suburb'n Ord. 5 p.c		116—119	.. 4 9 7
60,000	,,	,,	5	Do. 5 p.c. Pref.		118—121	.. 4 2 8
117,058	,,	Jan. 16	5	Do. 5 p.c. Deb. Stk.		120—125	.. 4 0 0
502,310	Stk.	May 14	5	Southampton Ord.		105—110*	.. 4 10 11
120,000	Stk.	Feb. 27	6½	Tottenham and Edmonton	A 5 p.c.	120—125	.. 5 8 0
398,940	,,	,,	5½		B 3½ p.c.	104—106	+½ 4 19 1
149,470	,,	Dec. 13	4		4 p.c. Deb.	99—102	.. 3 18 5
182,380	10	Dec. 30	8	Tuscan, Ltd.		10¼—10¾	.. 7 8 10
149,900	10	Jan. 2	5	Do. 5 p.c. Deb. Red.		99—101	.. 4 19 0
193,742	Stk.	Feb. 27	5	Tynemouth 5 p.c. max.		106—107	.. 4 13 6
255,636	Stk.	Feb. 13	6½	Wandsworth and Putney	B 3½ p.c.	128—133	.. 4 17 9
80,075	,,	Dec. 30	3		3 p.c. Deb. Stk	73—78	.. 3 16 11
845,872	,,	Feb. 27	5⅛	West Ham 5 p.c. Ord.		100—102	—½ 5 0 6
185,000	,,	,,	5	Do. 5 p.c. Pref.		118—120	.. 4 3 4
228,300	,,	Dec. 30	4	Do. 4 p.c. Deb. Stk.		102—107	.. 3 14 9

Prices marked * are "Ex div."

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The death of Mr. R. S. Carlow was not made public in time for my taking notice of it last week. He died in the house of a daughter in Stirling, to which he had been removed some time before. It had been evident for several years, to those who were accustomed to come in contact with Mr. Carlow, that his health was weakening. His bow was not bent at the full stretch, as it used to be. The passion for details, which always characterized him, was as strong as ever; but his grasp of business had slackened. His decline in health may have begun farther back than any of his friends observed, or even he himself was aware; and now that his life's chapter is closed, we may, in reason, regard mental deterioration as the cause of his later troubles. Towards the end, the mental condition was as far out of sorts almost as the physical. Before he became quite so feeble, the brave spirit he used to manifest remained with him, so much so that he resented the appointment, last autumn, of Mr. L. Hislop, of Uddingston, as interim Secretary of the North British Association of Gas Managers—albeit that even then he was altogether unequal to the duties of the office. He had done a great deal of secretarial work in his day—first in connection with the West of Scotland Gas Managers' Association, and latterly for the North British Association. In the performance of these duties he made many friends, by the urbanity and amiability of his demeanour, and his attention to the instructions of the Committee. While the members generally of the North British Association will miss and regret him, it is those who have passed through office who will regret him most; for, according to universal testimony at the annual meeting of the Association, he was a great help to the office-bearers.

It is somewhat strange that Mr. John M'Gilchrist, of Gourock, should have died on the same day as Mr. Carlow, and of the same disease. Mr. M'Gilchrist was not in good health five or six years ago. He was weak in the chest, and it was regarded as very much in his favour that his father having secured the work of directing the erection of new gas-works at Newport, Fifeshire, he was able to send Mr. M'Gilchrist to supervise operations. The bracing air of the east coast did effect a great improvement; and when he left Newport in 1903, to carry on similar work for his father in the salubrious climate of North Berwick, he did so with the utmost cheerfulness in the matter of his health. The stay at North Berwick brought a further improvement; and it was believed that he had overcome his constitutional weakness. When the vacancy occurred at Gourock, through the death of Mr. J. M'Ewan, Mr. James M'Gilchrist was engaged in the work of reconstructing the gas-works there, and his son was appointed, at first interim, and afterwards, at the beginning of 1906, Manager at Gourock. Not being possessed of the health with which his father was for many years blessed, Mr. John M'Gilchrist did not take any part in the public affairs of the North British Association; but he was regular in his attendance at the meetings, and also at the Informal Meetings.

The accounts of the Dundee Corporation Gas Department for the year ending April 30 are in draft, and will be issued soon. They show a total revenue of £129,384, as compared with £111,148 in the preceding year—an increase of £18,236. The expenditure amounted to £103,564, as compared with £85,654—an increase of £17,910. The balance to net revenue account on the year's working is £25,819, to which falls to be added £1644 brought from the previous year, making £27,464. After providing £6173 for annuities; £8223 for interest; £181 for expenses of loans; and placing £10,880 to sinking fund, there remains a free balance of nearly £2000 on the year's working. With this favourable result, it is proposed to reduce the price of gas by 2d. per 1000 cubic feet—from 2s. 6d. to 2s. 4d. Last year no change was made in the price. There were carbonized 85,747 tons of coal, an increase of 16,584 tons, and 84,208 gallons of oil, a decrease of 299,503 gallons; and 71,824 gallons of benzol were used for enrichment—an increase of 1689 gallons. The gas produced was 826,128,000 cubic feet—an increase of 66,980,120 feet; being at the rate of 9386 cubic feet per ton of coal carbonized, or a decrease of 240 cubic feet. The quantity of gas delivered was 825,848,000 cubic feet. The revenue from gas was £93,613—an increase of £8524 (the estimate was £3000); from coke, £20,369—an increase of £7466 (the estimate was £3000); from tar, £4041—an increase of £917; from sulphate of ammonia, £10,157—an increase of £1127; and from waggons, £1032—being an increase of £3. The cost of manufacturing gas was £81,592, and of distribution £12,295; rents, rates, and taxes amounted to £5888; and the charge for administration to £3797. The average cost of coal and carburetted water gas is stated to have been 1s. 7·36d. per ton. The total number of consumers at the close of the year was 47,038—an increase of 906; the increase being entirely upon prepayment meters. Gas-stoves number 14,147—an increase of 3324.

Last night the prizes gained by members of the Dundee Gas-Works Ambulance Class were presented by the Engineer—Mr. A. Yuill—who bore testimony to the efficacy of the work performed, and to the profit which had accrued to the members.

The Edinburgh and Leith Gas Commissioners held their monthly meeting on Monday last—Bailie Bryson, of Leith, in the chair. Bailie Douglas had given notice of the question—"How many workmen are employed at Granton Gas-Works, New Street, and other places, who work over fifty-one hours per week? Please state their employment, length of service, and wages." The Chairman remarked that Bailie Douglas was absent, but that Mr. Herring would answer the question. Mr. Herring stated that on the 1st of May there were 243 men working longer than fifty-one hours per week. The remainder of the question, and the information asked for, had already been published in a return dated the 1st of January, 1907. This return gave the fullest information with regard to the conditions of employment, the number of hours worked, and the like. Bailie Maxton asked, with regard to the Provisional Order the Commissioners were promoting, what copies were sent to the Town Clerk of Edinburgh, and the time they were sent. He did so because the Town Clerk stated to the Lord Provost's Committee that he had only got the copies on the morning of that day—the

BLAND LIGHT FOR FACTORY AND CHURCH.

GRANGE PRINTING WORKS,
EDINBURGH.
March 28, 1908.

With reference to the "BLAND" Light installation here, we are pleased to state that this has given us **every satisfaction,** and we find on comparing our last quarter's gas bill with the same quarter last year, that it has effected **a saving of between 20 and 30 per cent.** on the consumption of gas.

(Signed) BANKS & Co.

Note.—In addition to the saving effected, **the light was increased by over 100 per cent.**

PHOTOGRAPH TAKEN AT NIGHT BY THE "BLAND" LIGHT ONLY.

BLAND LIGHT SYNDICATE, LTD., LONDON and MANCHESTER.

London Show-Rooms: 63, Queen Victoria Street, London, E.C.
Telegrams:—
"BLANLITE LONDON." "GASBURNERS MANCHESTER."

Manchester Show-Rooms: 20, Fennel Street, Corporation Street.
Telephones:—
9239 London Wall and 4168 Central Manchester.

13th of May. The Clerk—Mr. J. M'G. Jack—replied that he sent the copies to the Town Clerk on the 16th of April, which was the day suggested by Mr. Beveridge, the Parliamentary Agent. The Chairman expressed disappointment that there should be any opposition by the Corporation of Edinburgh to what the Commissioners were proposing to do, and the hope that they might yet see eye to eye. Lord Provost Gibson, who had arrived, said the difficulty was about the proposed reduction in the illuminating power of the gas. Some of them were in favour of it, but others thought it too low. Mr. Lyon said there was also a difficulty about the testing of the gas. By the way the clause was worded, it was only a question of time when the gas would be as low as 14 candles, to be tested at the City Chambers. The Chairman thought that this could surely be adjusted without the Corporation going into opposition. Their Engineer had stated that although they had power to go down to 14 candles, he did not anticipate that it would be necessary to do it. The Works Committee were empowered to endeavour to adjust matters with the Corporation.

In the Court of Session on Wednesday, there was before the Second Division a petition by Messrs. James Milne and Son, Limited, of Edinburgh, asking authority to a proposed reduction of capital from £200,000 to £150,000. The petition was presented at the end of last year; and the reason for its being mentioned this week was the lodging of a report by Mr. G. W. Balfour-Kinnear, W.S., upon the regularity of the procedure and the reasons for reduction.

On the same day, the First Division had before them a petition by Peter M'Carroll, wine and spirit merchant, residing at Golfhill Drive, Dennistoun, Glasgow, asking for a supervision order in the liquidation of the Globe Gas-Engine Company, Limited, of Glasgow. The Company were incorporated in October, 1906, to take over the works carried on by Matthew Whyte, sole partner of Pollock, Whyte, and Waddell, Globe Gas-Engine Works, Dennistoun, Glasgow. The Company suspended payment on the 14th of April last. This petition was presented on April 21. It proceeds upon a decree for £200, obtained by the petitioner against the Company in the Court of Session on the 8th of April, and a charge to pay, which has not been implemented. The Court granted the petition.

The Gas Committee of the Arbroath Corporation had the accounts for the past year before them last night. These show a credit balance sufficient to enable a reduction to be made in the price of gas to the amount of, it is anticipated, 2½d. per 1000 cubic feet. Last June, the Corporation considered whether they would increase the price by 5d. or by 2½d. per 1000 cubic feet. They resolved upon the latter; making the price 3s. 1½d. The proposed reduction will restore the price to 2s. 11d., at which figure it stood from 1905 to 1907.

The Aberdeen Corporation Gas Committee on Wednesday accepted tenders for 69,000 tons of coal for the year, at a price which is 1s. 9½d. per ton less than last year.

A letter, by "A Busby Householder," published in the "Glasgow Herald" on Wednesday, was to the following effect: "The Busby Gas Question.—In connection with this question, a situation has arisen which calls for comment and action on the part of a section of the householders in this district. Briefly, the facts are as follows: The Busby and District Gas Company, Limited, supplies gas for Busby, Sheddens, Clarkston, and Giffnock. The price of the gas is 4s. 7d. per 1000 cubic feet. The Glasgow Corporation has power to supply gas as far as the boundary of Cathcart and Mearns parishes in Sheddens, Busby. In order to prevent the Corporation coming in, the local Company are arranging to supply gas to Giffnock, Clarkston, and Sheddens, at 2s. 4d. per 1000 feet. The other part of the Busby district, comprising the village of Busby proper and the Lanarkshire portion, is still to be content with the old rate of 4s. 7d. It is not—like the water question—a matter of different county areas or different sources of supply. The anomalous element of the situation lies in the fact that two parts of the same district, each supplied from the same source, are to be charged different rates—the one rate being practically double the other. I trust that the inhabitants who are still to be charged the higher rate will not 'take it lying down,' and that some of the influential householders will take action in this matter. By some method or another the Gas Company ought to be induced to put the entire district on an equal footing." A reply by another householder is published to-day. He comments on the situation having arisen out of the desire for the extension of the city of Glasgow; on the Corporation having offered an inadequate price to the Company; on their having laid mains through the district which will for long be unremunerative; and on the Company acting as they are doing in self-defence. He refers to the result of annexation to Glasgow being the raising of the taxation; and makes complaint of the district being at present overrun by canvassers from the Glasgow Corporation Gas Department. The Corporation of Glasgow have hitherto tolerated this Company within their area; and if they now desire to acquire its business, they should certainly offer an adequate consideration.

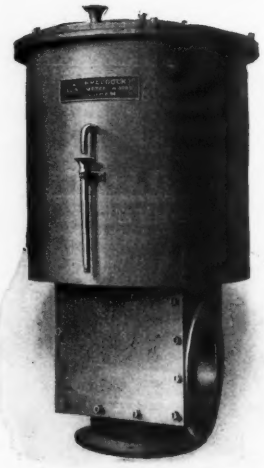
The Aberfeldy Gas Company have paid a dividend of 4 per cent. for the past year, and reduced the price of gas from 6s. 8d. to 6s. 3d. per 1000 cubic feet. Extensive improvements are to be made at the works.

In the Glasgow Town Council on Thursday, Mr. Nelson asked the Convener of the Water Committee if his attention had been called to renewed complaints as to insufficiency of water supply for domestic purposes within the districts of Pollokshields, Springburn, and Maryhill, and if he could state what steps had been, or would be, taken to remedy the grievances. Mr. Watson replied that a deputation had been received about a fortnight before, from Pollokshields, in regard to the matter. In consequence, the Water Engineer had made certain alterations upon some of the water-mains, which should remedy the defects in that district. Regarding Springburn and Maryhill, repeated complaints had come to the Committee during the winter and spring months. These complaints had been investigated; and they were waiting for a complete report from the Water Engineer relative to the causes which led to the complaints. So far as his information went, the principal cause of the complaints arose from landlords and others not furnishing adequate reservoir or storage capacity. The Water Engineer and he were going into the matter, to see if it were at all possible to extend the arrangement whereby special mains would be used to supply the higher levels of the city.

BRADDOCK'S

ENCLOSED RETORT-HOUSE GOVERNORS

ARE UP-TO-DATE AND RELIABLE.



SECOND TO NONE.

Desirable. Most Efficient. Repeat Orders have been received.

The Braddock Retort-House Governor may be relied upon to maintain the most desirable conditions of exhaust or pressure in the hydraulic main, &c., thereby ensuring steady illuminating power and the best yield of gas under local circumstances.

J. & J. BRADDOCK (BRANCH OF METERS LIMITED), Globe Meter Works, OLDHAM,

Telegrams: "BRADDOCK, OLDHAM." National Telephone No. 815.

AND 45 & 47, WESTMINSTER BRIDGE ROAD, LONDON, S.E.

Telegrams: "METRIQUE, LONDON." Telephone No. 2412 HOP.

CURRENT SALES OF GAS PRODUCTS.

Sulphate of Ammonia. LIVERPOOL, *May* 30.

The market has been quiet at all points, and there has been a further decline in values; the closing quotations being £12 3s. 9d. per ton f.o.b. Hull, £12 5s. to £12 6s. 3d. per ton f.o.b. Liverpool, and £12 7s. 6d. per ton f.o.b. Leith, for prompt delivery. For June delivery, these prices are not obtainable; buyers being inclined to wait in regard to the month's requirements. For July-December delivery, £12 5s. per ton is being generally quoted by makers, but there is speculative offering abroad at below the equivalent, and it does not attract much attention.

Nitrate of Soda.

This article also remains very quiet; the spot quotations being 10s. and 10s. 3d. per cwt. for 95 per cent. and refined qualities respectively.

Tar Products. LONDON, *June* 1.

The markets are still dull, and there is little demand for any of the usual articles. Pitch is very quiet for either prompt or forward delivery. For prompt, business has been done on the east coast at 18s. 6d.; while in Manchester, makers have been offering at 18s. f.a.s. without success. For forward, Continental consumers refuse to purchase any further quantities for delivery this year; while for January-June next, contracts have been taken at under 20s. England. In South Wales very low figures are talked of. Creosote is quiet, with very little alteration in figures. Benzol, 90 per cent., is offered in London at 8d. f.o.b.; while in the North 7½d. has been accepted. Benzol 50-90 per cent. and toluol are both neglected, and little fresh business seems to be possible just now. Solvent naphtha appears to be rather steadier; and several makers, having cleared out some quantity, are now holding for better figures. 60's carbolic are very dull. Continental manufacturers will not buy for prompt, and decline to bid more than 1s. 5½d., east coast, for delivery to the end of the year. Creosote salts are quiet, and naphthalene is unchanged.

The average values during the week were: Tar, 11s. 6d. to 15s. 6d. *ex* works. Pitch, London, 20s.; east coast, 18s. 6d. to 19s.; west coast, 18s. to 19s. f.a.s. Benzol, 90 per cent., London 8d., North 7½d. to 7⅝d., casks included; 50-90 per cent., London 7⅝d., North 7¼d. to 7½d., casks included. Toluol, London 8d., North 7½d., casks included. Crude naphtha, in bulk, London 3⅛d. to 3⅜d., North 3¼d. to 3⅜d.; solvent naphtha, London 10d. to 10⅛d., North 9d. to 9⅛d., casks included; heavy naphtha, London 10⅛d. to 10⅜d., North 9¼d. to 9⅜d., casks included. Creosote, London 2⅛d. to 2¼d., North 2d. to 2⅛d., in bulk. Heavy oils, 2⅛d. to 2⅜d., in bulk. Carbolic acid, 60 per cent., east coast 1s. 6d., west coast, 1s. 5½d., casks included. Naphthalene, £4 10s. to £8 10s.; salts, 30s. to 32s. 6d., packages included and f.o.b. Anthracene, "A" quality, 1⅛d. to 1⅜d. per unit, packages included and delivered.

Sulphate of Ammonia.

The market is quiet for both prompt and forward delivery. The principal Gas Companies quote £12 7s. 6d., but are so well sold as to be practically out of the market for prompt. Outside London makes are fetching £12 to £12 5s., according to quality. In Hull, business has been done at £12 3s. 9d. to £12 5s.; and in Liverpool, at £12 6s. 3d. to £12 7s. 6d. In Leith, makers ask £12 10s., but lately have been unable to obtain this figure.

COAL TRADE REPORTS.

Lancashire Coal Trade.

It had been expected in many quarters that a general reduction in the price of coal in this and other adjoining districts would have been made as from June 1; but no such reduction has taken place. Manchester district colliery owners have resolved to adhere to the prices which have ruled for months past. Their stocks are low; the Whitsuntide holidays are at hand; and, added to such total stoppage as may be determined upon, many of the pits have for some time past been working only four days per week. With stocks low and demand good, coalowners are in an independent position. Large contractors in railway and gas coal have been endeavouring to secure renewed contracts on easier terms; but beyond a reduction of 6d. per ton on last year's prices, no further reductions are contemplated. Even in South Yorkshire, North Derbyshire, Nottinghamshire, and in Staffordshire, where the coal is not equal to that of more northern metal in quality, the only reduction heard of rarely exceeds 6d. per ton. Gas companies are said to be waiting in hope of concessions from the 1st of July. The demand for house coal is falling off considerably. The shipping trade is good. Engine coal is moderate.

Northern Coal Trade.

There is still a strong demand for coals; and as in the next few weeks the production will be reduced by general and local holidays, it is probable that the pressure of the inquiry will continue. In the steam coal trade, best Northumbrians are quoted from 14s. to 14s. 6d. per ton f.o.b. For second-class steams, the price is from 12s. to 12s. 9d., and steam smalls are from 6s. to 7s. The production at the collieries is heavy, and it is well taken up for most kinds of fuel; while the prospect of a fuller demand for manufacturing fuel is better. In the gas coal trade, good Durham coal is being quoted from about 10s. 6d. to 11s. 6d. per ton f.o.b.; while Wear "specials" are from 12s. to 12s. 6d. The local consumption is now about at its lowest, but there is a full export; the Baltic requirements being heavy, and fair quantities being sent to the ports of France and of the Mediterranean. There are now fewer contracts in the market; and some of the best of the gas-coal collieries seem to have allotted the bulk of their output. Some of the local contracts—such as those for Darlington—have been

"CANNON"
ADS. No. 1.

BULL'S EYES.

PAST.—(1) We introduced **loose Fronts and Bricks** for Gas-Fires (see Patent).
(2) We introduced **Side Bridges** for Cookers.
(3) We introduced the Air and Gas Regulator.
(4) Our Bachelor Griller (Fig. 2281) is now being followed by our competitors.
(5) We were the Pioneers of **loose Hot Plates** in the form of Hinged Top Bars or Racks.
(6) We are the Sole Owners of "Porceliron."

PRESENT.—Engaged on something "revolutionary," which the **FUTURE** will disclose (see our ADS.).

CANNON IRON FOUNDRIES, LIMITED,
18, HOLBORN VIADUCT, LONDON, E.C.
Works: DEEPFIELDS, near BILSTON, STAFFS.

allotted at an appreciable reduction on the prices of a year ago—the average decrease in the instance named being about 2s. per ton. Coke is steady generally; and the quotation for good gas coke is from 14s. 3d. to 15s. 3d. per ton f.o.b. on the Tyne or Wear—the lessened output having stiffened the prices.

Scotch Coal Trade.

Trade continues upon the same lines as during the past few weeks—shipping demand good and home trade bad, particularly for small sorts. The settlement of the shipyard trouble, if it be given effect to, which it has not yet fully, will open the outlet for coal; and matters at home may be expected to improve. Some such expectation may be taken as the reason why prices have not of late gone farther back than they have. The prices quoted are: Ell 11s. 6d. to 12s. 6d. per ton f.o b. Glasgow, splint 10s. 9d. to 11s., and steam 10s. 3d. to 10s. 6d. The shipments for the week amounted to 319,424 tons—an increase of 24,584 tons upon the previous week, and of 26,439 tons upon the corresponding week of last year. For the year to date, the total shipments have been 5,125,949 tons—a decrease of 346,685 tons upon the corresponding period of 1907.

Meters Limited.

Alderman John Miles, of Bolton, the Chairman, presided at the eleventh annual meeting of this Company, held at the Memorial Hall, Manchester, last Tuesday. A summary of the balance-sheet appeared in the "JOURNAL" last week (p. 522). The Chairman explained that had the Directors cared to tamper with the stock, which stood in the books at "rock bottom" prices, the usual dividend (6 per cent.) could have been paid legitimately. He and his colleagues on the Board regretted the reduction to 5 per cent.; but it was gratifying to know that, in comparison with similar concerns, they had done remarkably well. There was good reason for believing that they would soon be earning enough to pay the usual dividend. One of the factors operating against them during the past year had been the high price of metals; and they had also had to deal with what he could only describe as insane competition on the part of certain meter-making concerns who had "cut" prices a great deal. Though very much disappointed with the balance-sheet, Mr. Baskerville (a shareholder) said he was glad to hear from the Chairman that matters were not so bad as they at first appeared. He noticed that the profits had fallen from £35,000 and £31,000, in 1906 and 1907 respectively, to less than £26,000 in the past year. He wondered what the fate of the Company would be if these reductions continued; and he asked why the Directors had not distributed some of their reserve. Mr. Marsh declared that the Company had made a greater profit on their capital than any other firm in the same trade. Mr. Cross thought the Directors were wise in carefully preserving the reserve fund of £55,000, by taking £1700 out of which they could have paid another 1 per cent. dividend. The Chairman assured the shareholders that the prospects of the Company were brighter than they were a year ago. The report and balance-sheet having been adopted, it was resolved that the Directors be granted £300 in addition to the £500 provided for by the Articles of Association.

The Glossop Corporation and the Gas-Works.—At the last meeting of the Glossop Town Council, the Clerk (Mr. T. W. Ellison) said the Directors of the Glossop Gas Company stated that they had no desire to sell the undertaking; but if the Council cared to make an offer, it would be considered. They would not, however, entertain any figure less than £100,000. Mr. Eastham said if they were to borrow the money at 4 per cent. it would mean £4000 for interest alone; and as the net profit last year, which was a very good one, was only £4773, it would not leave much to go on with. He moved that the purchase be not entertained; and this was agreed to.

Gas Supply in Russia.—In the British consular report on the trade of Poland and Lithuania for 1907, which has just been issued by the Foreign Office, it is stated that the Directors of the gas-works at Lodz have succeeded in getting an agreement with the municipal authorities prolonged to 1909. The yearly production of gas at Lodz is estimated at 200 million cubic feet, 30 per cent. of which is consumed in the street-lamps. As Lodz is rapidly growing, it is proposed to erect new gas-works, at a cost of £100,000. Electric lighting was introduced at Warsaw by degrees—at first only in 40 streets where the rails for electric trams were laid. In view of this, the output of gas considerably diminished. The conductors of the gas-works, however, did not dismiss their men, for fear that troubles might ensue, but the number of working days per week was reduced to four. At the same time, it was decided to extend gas lighting to the outskirts of the town, where no electric light has been installed.

Sales of Stocks and Shares.—At the Mart, Tokenhouse Yard, E.C., last Wednesday, Messrs. A. & W. Richards disposed of four new issues of capital by order of Directors. A few ordinary £10 shares (7 per cent.) in the Barking Gas Company fetched £13 to £13 12s. 6d. each; and some 6 per cent. preference shares, of similar nominal value, £12 15s. to £13 2s. 6d. each. Some additional ordinary £10 shares, ranking for a dividend of 7 per cent. (last dividend 5¼ per cent.), in the Lowestoft Water and Gas Company, fetched £11 2s. 6d. to £11 7s. 6d. apiece; and £1000 of 4 per cent. perpetual debenture stock was placed at £102 per £100. Additional consolidated ordinary stock of the Maidenhead Gas Company to the nominal amount of £5000, ranking for a standard dividend of 5 per cent. per annum subject to the sliding-scale (the dividend on similar stock being £5 7s. 6d. per cent.), was all disposed of at £101 to £102 per £100. Some £10 "B" shares in the Tendring Hundred Water Company, ranking for 8 per cent. maximum dividend but carrying 4½ per cent., were sold at par. On the same occasion, Messrs. Richards sold, by order of executors, £1030 of 5 per cent. consolidated ordinary stock of the Chigwell, Loughton, and Woodford Gas Company, at £104 10s. to £105 per £100 of stock, *cum div.* at the rate of 5½ per cent. per annum as from Jan. 1 last. The preceding day, Messrs. Hollis and Webb, of Leeds, sold some "B" and "C" shares of the Heckmondwike Gas Company at £13 10s. each.

CARRON

GAS COOKERS.

The Latest in Slot Cookers.

The

"Carron" No. 650 "Esto" Series.

LINED THROUGHOUT.

A Post Card will bring you full particulars.

Carron Company

INCORPORATED BY ROYAL CHARTER 1773

WORKS: CARRON, STIRLINGSHIRE.

Kendal Gas and Water Supply.—At the monthly meeting of the Kendal Town Council last Tuesday, the annual statements dealing with the Gas, Water, and Electricity Departments were presented. The receipts for gas amounted to £14,610, and the expenditure to £11,049; leaving a gross profit of £3561. Interest, sinking fund, and other charges absorbed £2750; and £760 of the surplus was voted for the relief of the rates. For the first time since the Corporation took over the works, there was a surplus profit on the Water Department; the amount being £93. The gross profit was £2381.

Hythe and Sandgate Gas Company.—At a special general meeting of this Company held at Hythe last Wednesday, the shareholders unanimously resolved to empower the Directors to issue the remainder of the authorized capital as and when required. At this meeting, Mr. Percy Griffith, M.Inst.C.E., attended as a Director of the Company, having been co-opted by the other Directors to fill a vacancy caused by the decease of Mr. Amos. The presence of a gas engineer on the Board was regarded by the shareholders present as a good augury for the working of the undertaking; and Mr. Griffith was able to forecast a very prosperous future for the Company under the new *régime* which the Directors had inaugurated on his advice. There have recently been erected two new regenerative settings of retorts, with a blank arch to take a third; the whole of the machinery had been overhauled, and many other improvements are being carried out.

Stourbridge Gas Undertaking.—At the last monthly meeting of the Stourbridge Urban District Council, the Gas Committee presented the third annual report of the Engineer and Manager (Mr. C. H. Webb) on the working of the undertaking. The sales of gas, both by ordinary and prepayment meters, showed increases as follows: Ordinary meters, 1,830,600 cubic feet, or 1·44 per cent.; prepayment meters, 3,165,000 cubic feet, or 7·94 per cent. When the Council purchased the gas-works fifteen years ago, the total sale of gas was 81,879,400 cubic feet; whereas in the past financial year it was 189,834,200 cubic feet—an increase of 107,954,800 cubic feet, or at the rate of 131·8 per cent. The most prominent feature of the year had been the great rise in the price of coal (about £1800), which the Council had decided to bear without increasing the price of gas. The revenue account showed a gross profit of £10,553, of which, after deduction of the annual instalments for repayments and interest, &c., there would remain a surplus of £1812; the proportion of this available for the relief of the rates being £1428. The report was adopted.

Additional Capital for the West Ham Gas Company.—From an advertisement which appears elsewhere, our readers will see that the Directors of the West Ham Gas Company are inviting tenders for an issue, under the powers conferred by their Act of 1902, of £25,000 of perpetual 4 per cent. debenture stock, a similar amount of 5 per cent. preference stock, and £50,000 of consolidated ordinary stock, at the minimum prices of £102, £115, and £101 respectively per £100 of stock. Upon each of the stocks a full six months' interest or dividend to the 31st of December next will be paid. The additional capital is needed for further prepayment installations, and for the general requirements of the Company, who supply gas in the boroughs of West Ham (including Stratford, Forest Gate, and Plaistow) and East Ham, and the districts of Leyton, Leytonstone, Snaresbrook, Wanstead, and Woodford. It may be pointed out that since the introduction of prepayment meters in 1903, the Company's net profits have risen from £39,286 to £54,870, and the balance carried forward, after payment of dividends, from £3402 to £20,287; and that on the 1st ult. their prepayment customers numbered 35,040 out of a total of 57,771. Tenders for the new issues of stock must be sent in by 2 p.m. next Thursday.

Losses on a Gas-Meter Company.—At the London Bankruptcy Court last Tuesday, before Mr. Registrar Linklater, an application was made by Victor Veysey, described as of No. 36, Victoria Street, Westminster, to vary an order of discharge. It appeared that the debtor was promoter of Frank Wright's Gas-Meter Company; and he attributed his failure to losses through speculations, tightness of money owing to the South African War, household and personal expenses at the rate of £5000 per annum, and sundry other causes. The receiving order was made against the debtor in March, 1900; and upon his previous application for discharge the Court ordered it to be suspended until he had paid a dividend of 10s. in the pound on the amount of his unsecured liabilities. The statement of affairs filed under the bankruptcy proceedings showed liabilities amounting to £39,455, and the assets had realized £1042. The debtor lost a considerable sum in connection with the above-named Company; and at present he saw no probability of his being able to get so large a sum as would be required to pay his creditors 10s. in the pound. His Honour said he would treat the case *de novo*; and, owing to the serious nature of the submissions in the report of the Official Receiver, the discharge would be suspended for seven years from the date of the original hearing in January, 1906.

Gas v. Electricity in the City.—The Engineer to the Corporation of London (Mr. Frank Sumner, M.Inst.C.E.) has just issued a report with regard to the experiments which, at the instance of the two City Electric Lighting Companies, are being carried on for the purpose of making comparison between the respective merits of electricity and gas for street lighting. Experimental lighting has been installed both in the main thoroughfares and in the side streets. The City of London Electric Lighting Company are lighting Holborn Viaduct, Holborn, and part of the Old Bailey with 21 "Oriflamme" white or golden arcs of 1500 actual candle power; Farringdon Street with 18 small enclosed arcs of 500-candle power; and Newgate Street with 10 smaller lamps, the power of which is not stated. As the high-pressure gas-mains are in the whole of these thoroughfares, except between Holborn Circus and the corner of Gray's Inn Road, the City Engineer explains that a comparison of cost will be obtainable under very favourable conditions. For the Holborn Viaduct and Old Bailey area, the existing lighting costs £390 annually; and it is stated that the proposed lighting would come to £262, against £251 for high-pressure gas. In Farringdon Street the present cost is £312; and that of the proposed lighting would be £193, compared with £211 for gas. In Newgate Street a cost of £182 is at present involved; and the new scheme proposed would mean an expenditure of £95, against £71 for high-pressure gas. Thus for the three areas a total annual saving of £332 is anticipated, compared with the present cost; and the difference in favour of gas is £17 17s.

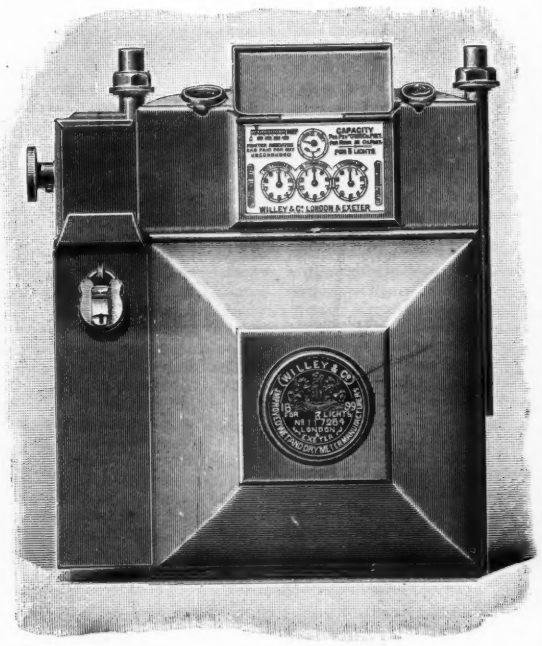
THREE POINTS

of advantage from the many found in our Slot Meters are:

1st.—They are Fraud Proof, and cannot be tampered with through the Slot.

2nd.—The Slot is closed when the maximum number of Coins have been inserted.

3rd.—Our Price-Changing System is the Simplest, Quickest, and most Accurate yet devised.



ALL PARTS INTERCHANGEABLE.

Tens of Thousands in use, and adopted exclusively by many Gas Companies.

WILLEY & CO., LTD., LONDON & EXETER.

AGENTS FOR SCOTLAND:

D. M. NELSON & CO., 53, WATERLOO STREET, GLASGOW.

Warrington Corporation Gas Supply.—The Warrington Corporation Gas Department made a net profit for the year ending March 31 of £15,593; being an increase of £800 compared with the previous year. Of the gross profits (£23,800), the sum of £8207 was absorbed by the payment of interest and the instalment of the sinking fund. There was an increase of nearly 23 million cubic feet in the quantity of gas manufactured.

Heywood and Middleton Water Board.—The report of the past year's working of the Heywood and Middleton Water Board shows a deficiency of £5006, against £1895 for the previous year; and the deficiency has been apportioned between the two towns in about equal shares. At the last meeting of the Board, the Chairman (Mr. Thomas Popple) attributed the position largely to the wet summer of 1907, which resulted in a decreased demand for water.

Malta and Mediterranean Gas Company, Limited.—At the ordinary general meeting of this Company on the 16th inst., the Directors will report that the balance of the general revenue account for the year ending the 31st of March last is £5598; and they will recommend the payment of the usual dividends on the first and second preference capital, and a dividend of 4 per cent., free of income-tax, on the ordinary capital—making with the interim dividend paid in December last 6 per cent. for the year, and leaving a balance of £720 to be carried forward.

Southampton Water-Works Management.—At the meeting of the Southampton Town Council last Wednesday, the recommendation of the Water Committee to appoint Mr. J. Chalk, of the Water-Works Department, Manager of the water undertaking on probation (see *ante*, p. 385), was agreed to. On the same occasion, the Committee reported that they had received a letter from Mr. C. J. Haines, resigning his position as Resident Engineer at the Otterbourne Water-Works. On the motion for the adoption of the report, Mr. Cheverton moved, as an amendment, that Mr. Haines be dismissed from the service of the Corporation. Mr. Lewis seconded the amendment, and after some conversation it was passed.

Complaints as to Manchester Gas.—A memorial from the parishioners and members of the congregation of St. Thomas's Church, Ardwick, complaining of the quality of the gas, has been presented to the Corporation of Manchester, and referred to the Gas Committee. In the course of their memorial, the signatories say: "The quality of the gas at present supplied is such that the clergy, the choir, and the congregation are not able to read, as they should, the books in use in the church; and the lighting of the clock-tower is so dim that the publicly illuminated clock is of little use to the neighbourhood. We have made complaints to the officials at the Town Hall, but without any good result. The pressure of the gas in the church has been increased, causing an additional consumption of gas and greater expense; but the evil is not removed. We were told of public meetings where the light had been improved by means of incandescent gas-burners, and have been at considerable expense in supplying these in various parts of the church; but the evil remains. Large 'profits' are made upon the gas. It would appear that these profits are made at the expense of the gas consumers, who are compelled to put up with this inferior quality of gas."

The New Retort-House at the Lum Street Gas-Works, Bolton.—At the Lum Street Gas-Works of the Bolton Corporation last Saturday, a date stone was set by Mr. William Smith, the Engineer and Manager, some 30 feet above ground in the south wall of the new retort-house which is now being erected. In a recess beneath the stone was placed a photograph of Mr. Smith, and a sheet of paper, upon which was written: "This retort-house was built in the year 1908 A.D., from the designs and details of Wm. Smith, Gas Engineer and Manager, and Sidney Smith, Assistant-Engineer; brickwork by Wm. Gornall, contractor, Bolton (foreman, Mr. J. Evens); stonework by the Bolton Stone, Concrete, and Asphalt Company, Bolton (foreman, Mr. P. Wolfenden); and ironwork by John Booth and Sons, Bolton; built under the supervision of Wm. Smith, Gas Engineer and Manager, and Sidney Smith, Assistant-Engineer." There were also a number of other small mementoes in the bottle, but no coins, as they were wanted for other purposes. After placing the bottle in the recess, the date stone, upon which was carved "William Smith, 1908, Engineer," was hoisted up by the workmen and placed in position. Mr. Smith then proceeded to bed it level and plumb it its correct position; and after the last tap from his mahogany mallet, he turned to the assembly and declared the stone to be well and truly laid. The new house is 169 ft. 6 in. long and 136 feet wide, and the height from the ground to the eaves of the roof will be about 30 feet. It will be covered with a slated roof in two spans, on the primary and secondary system of special design, which will reach over 576 retorts.

The "Bland" Light for Printing Office and Church Lighting.—The Bland Light Syndicate, Limited, have recently received testimonials in favour of their light when employed for the above-named purposes. Mr. R. L. Banks, Director of Messrs. Banks and Co., of the Grange Printing Works, Edinburgh, states that the installation in their establishment has given every satisfaction; and they find, on comparing their last quarter's gas bill with that for the corresponding quarter of 1907, that it has "effected a saving of between 20 and 30 per cent. on the consumption of gas;" and, in addition to this saving, "the light was increased by over 100 per cent." The following information in regard to this installation has just been furnished by Messrs. Morrison and Son, of Edinburgh: "The original gas installation in the composing-room was 84 ordinary burners, giving 1008-candle power. We introduced 44 'Bland' burners with obscured globes, giving a light equal to 3100-candle power. The consumption of gas with ordinary burners from Oct. 11, 1906, to Jan. 14, 1907, was 96,005 cubic feet. With 'Bland' burners, from Oct. 11, 1907, to Jan. 14, 1908, it was 78,003 cubic feet. A considerable amount of overtime was worked, amounting to at least 50 hours, in connection with the second reading—that is, the one with the 'Bland' light. In addition to the above, only one mantle has had to be replaced, and that was accidentally broken by one of the workmen; so that the upkeep is *nil*." In addition to the above, the following information has been furnished about St. Baldred's Church, North Berwick. This installation consists of 23 "Bland" burners, taking the place of 73 ordinary flat-flame burners. The church, which used to be in semi-darkness, is now stated to be brilliantly illuminated. The reading of the meter from January to April, 1907, using flat-flame burners, was 14,200 cubic feet; from January to April, 1908, using 23 "Bland" burners, 3800 cubic feet—a saving of 10,400 cubic feet.

"ILLUMINATING TRUTHS."

LEAFLETS FOR DISTRIBUTION.

No. 1.—"The Sanitary Aspects of Gas and Electric Lighting."
No. 2.—"The Cleanliness of Illuminants: The Eyesight."
No. 3.—"Fire Risks."
No. 4.—"The Relative Cost of Gas and Electricity, and Matters affecting it."
No. 5.—"On Reliability, with Instances of Misplaced Confidence."
No. 6.—"On Shop Lighting, with Special Reference to the Flame Arc Lamp."
No. 7.—"The Osram Lamp: Fiction and Fact."

This series of Leaflets will be useful, not only for distribution among Householders generally, but for circulation among Shareholders to fortify them with arguments defence of the commodity in which they have invested capital. Copies of each Leaflet should also be kept in every Gas Undertaking's Show-Rooms.

Prices for Quantities on Application to WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situation Vacant.

CLERK OF WORKS. Portsea Island Gas Company. Applications by June 10.

Situations, &c., Wanted.

CLERK OR CLERK AND COLLECTOR. No. 4949.
DRAUGHTSMAN AND SURVEYOR. "H. B. A.," c/o Horncastles.
ENGINEER. No. 4943.
REPRESENTATION (GAS PLANT FIRM). No. 4945.
SECRETARYSHIP. A. L. Griffith, 46, Queen Victoria Street, E.C.
WORKING MANAGER. No. 4950.
WORKING MANAGER. No. 4944.

Gas Examination Classes.

CORRESPONDENCE COLLEGE COMPANY, CAMBRIDGE.

Plant (Second-Hand), &c., for Sale.

CONDENSERS, ENGINES AND EXHAUSTERS, SCRUBBERS, PURIFIERS, RETORT-HOUSE FITTINGS, &c. Ellis, Etruria Works, near Stoke.
ENGINE AND EXHAUSTER. Shotley Bridge Gas Company.
"JOURNAL" VOLUMES. No. 4947.
PLANT, MACHINERY, &c. (LAMP MANUFACTURERS). Anderson and Duffield, Slough.
PURIFIER VALVES. Malton Gas Company.
TESTING APPARATUS AND TECHNICAL JOURNALS. Executors of the late Mr. F. H. Leeds, Bridport.

Plant (Second-Hand), &c., Wanted.

PURIFIERS. No. 4948.

Patents for Disposal or Licences to Work.

TUBES, &c. Lloyd Wise and Co., Lincoln's Inn Fields, W.C.
VALVES, &c. Haseltine, Lake, and Co., Southampton Buildings, W.C.

Meetings.

INSTITUTION OF GAS ENGINEERS. June 16 to 18.
MALTA AND MEDITERRANEAN GAS COMPANY. June 16. Twelve o'clock.

Capital Wanted. No. 4946.

Stocks and Shares.

CHIGWELL, LOUGHTON, AND WOODFORD GAS COMPANY. June 16.
FALMOUTH WATER COMPANY. June 16.
ILFORD GAS COMPANY. June 16.
HAYWARDS HEATH GAS COMPANY. June 16.
WEST HAM GAS COMPANY. June 4.

TENDERS FOR

Coal and Cannel.

BIRMINGHAM GAS DEPARTMENT. Tenders by June 9.
BRIDGNORTH GAS DEPARTMENT. Tenders by June 13.
CHORLEY GAS DEPARTMENT. Tenders by June 10.
COALVILLE GAS DEPARTMENT. Tenders by June 15.
LEAMINGTON PRIORS GAS COMPANY. Tenders by June 16.
LINCOLN GAS DEPARTMENT. Tenders by June 12.
NEWBURY GAS DEPARTMENT. Tenders by June 13.
OXFORD GASLIGHT COMPANY. Tenders by June 10.

Coal and Cannel—*continued.*

PAIGNTON GAS COMPANY. Tenders by June 13.
ROCHESTER, &c., GAS COMPANY. Tenders by June 10.
SALISBURY GAS COMPANY. Tenders by June 12.
SHREWSBURY GAS COMPANY. Tenders by June 13.
SPALDING GAS DEPARTMENT. Tenders by June 10.
STOKE-ON-TRENT GAS DEPARTMENT. Tenders by June 4.
STOURBRIDGE GAS DEPARTMENT. Tenders by June 12.

Exhauster.

CHORLEY GAS DEPARTMENT. Tenders by June 10.

Meter (Station).

STOURBRIDGE GAS DEPARTMENT. Tenders by June 12.

Retort-House Governors.

STOURBRIDGE GAS DEPARTMENT. Tenders by June 12.
TIPTON GAS DEPARTMENT. Tenders by June 15.

Pipes, &c.

BRIDGNORTH GAS DEPARTMENT. Tenders by June 13.

Tar and Liquor.

BRIERLEY HILL GAS COMPANY. Tenders by June 15.
OLDHAM GAS DEPARTMENT. Tenders by June 23.
STOURBRIDGE GAS DEPARTMENT. Tenders by June 12.
STRETFORD GAS COMPANY. Tenders by June 15.

Waggons.

STOURBRIDGE GAS DEPARTMENT. Tenders by June 12.